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Editor
ROY WALDO MINER

Associate Editor
LOTHAR SALIN

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TRANSACTIONS
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Ser. II, Vol. 10 *November, 1947* *No. 1*

SECTION OF BIOLOGY*

NEW METHODS AS TEACHING AIDS IN SCIENCE

By AUSTIN JOYNER†

A method of using visual aid in the teaching of elementary scientific subjects has elicited interest. No claim is made that there is anything actually new in the method demonstrated. However, it is felt that this method and the manner in which it is used, represent a distinct advance in the difficult task of visualization of scientific subjects.

The materials consist of a board approximately the size of an average blackboard which is constructed in sections so that they can be disconnected and made portable. The face of the board is covered with a soft, black, woollen cloth which has been tightly stretched and is attached at the edges of the board. The symbols or pictures which illustrate the subject being discussed are drawn or painted on the surface of appropriately shaped pieces of cardboard. The back face of these cardboard pictures has zig-zagged strips of sandpaper pasted on its surface.

The board is used very much in the same manner that an ordinary blackboard would be used in a class demonstration or lecture. Symbols or pictures illustrating each point in the talk are placed on the board by pressing the sandpaper surface onto the cloth surface of the board with a slight downward motion. This allows the picture to remain in position as the sandpaper catches onto the cloth surface.

The use of the board can be illustrated by using symbols and pictures which are designed to present such subjects as Immunology, Nitrogen Balance, Nutritional Aspects of Folic Acid, and Atopic Allergy. Naturally, this kind of board can be used in a fully lighted room, so that the full personality of the speaker still remains in play. Also, simplicity of design, the advantages of color, and the shape of the symbols add to the possibility of retention by the audience. The board was originated by Mr. J. Hile and Mr. William Damroth, who have also interested themselves in the commercial production of numerous lecture illustrations. This method has been extremely successful in presenting complicated scientific subjects in a simplified form to large numbers of adults who have had very little scientific training.

*The Section of Geology held a meeting on October 6, 1947, at which Doctor L. H. Adams, Geophysical Laboratory, Carnegie Institution of Washington, Washington, D. C., presented a paper entitled, *Unsolved Problems in Geophysics*, illustrated by lantern slides. No abstract of this has been received.

†Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y. This paper, illustrated by demonstrations of material, was presented at the meeting of the Section on October 13, 1947.

Note. The Section of Psychology held a meeting on November 20, 1947, at which Doctor Clemens E. Benda, Walter E. Fernald State School, Waverley, Massachusetts, presented a paper entitled, *The Hereditary and Non-Hereditary Mental Disorders of Infancy and Childhood*, illustrated by lantern slides. This will be published in a later number of TRANSACTIONS.

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SECTION OF ANTHROPOLOGY

ANTHROPOLOGY AND EARLY INTER-AMERICAN RELATIONS

By HARRY BERNSTEIN*

The search for common origins of the Americas, combined with the rise of ethnological interest in the native peoples, has had the effect of creating and tightening cultural ties in the western hemisphere. Study of New World anthropology and archaeology has quickly become inter-American by bringing North American scholarship closer to Latin American. It would be hard to say whether historical studies about Indian antiquities provided greater incentive for cooperation than did ethnology at the time, but certainly both together guided and influenced prevailing theories and researches. During the nineteenth century, Latin American history was never far away from Latin American ethnology. The result was that Amerindian investigation brought together the workers and societies of both continents in harmonious and constructive contact.

In spite of the difficulties that blocked direct relations during the late colonial period, North American interest in Latin American aboriginal history and society has always attracted the foremost minds in American history. From the eighteenth century to the present, the work of individuals supported by the learned societies of this country opened up to view and discussion many aspects of American Indian culture. Set off by such early American figures as Benjamin Smith Barton, Ebenezer Hazard, Jeremy Belknap, the ties of science were pushed towards Latin America by the American Philosophical Society, and by Dr. Samuel Latham Mitchill of the Lyceum of Natural History in New York (now The New York Academy of Sciences). For many years, the Latin American Indian was as well known and as much at home in Boston, Philadelphia, and New York, as he was in Central Mexico, Yucatan, and Peru.

But during these years—before 1820—Indian civilization could be known only through reading. Books and chronicles, made available by libraries, publishers, and serial reprints in newspapers, were the chief means of building up knowledge. The reasons for this are well known: travel was difficult, Latin America was politically in another universe, and the fashion of culture was to read and discuss what others had seen and observed. Not until Latin America was free from Spain, after the wars for independence, were peoples and monuments of the continent opened up to direct inspection. Field travel and experience entered into judgments of archaeology and ethnology alongside the older descriptions and assertions of written literature.

It was then that North Americans began to make common cause with Latin Americans in joint rediscovery of the antiquities of their continent. It was not easy to achieve this. Ethnological study was for a long time to be dominated by armchair authority, literary and bookish in method. Book knowledge was a sort of carry-over of humanist influences, and the historian, chronicler, and observer of Latin America held highest honors. However, between the early and present stages of Amerindian study lay the record of hard field work, checked against earlier sources and writers. The study of man in his social and geographical habitat began to grow up in an inter-American world of its own, free from the dictatorship of the literary source, yet familiar with its opinion.

To be fair about this, we must admit that a great many Americans were rather well read on the subject of Indian an-

*Department of History, Brooklyn College, Brooklyn, N. Y. This paper was presented at the meeting of the Section on October 27, 1947.

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tiquities, even though their interest in contemporary Indian society lagged far behind. Literary materials were the last word, and individual volumes and well known collections were plentiful in the United States. In fact, many of the more celebrated books by Spaniards and Latin American colonials were available to North Americans. But other handicaps resulted from what would otherwise have been praiseworthy reading knowledge. In addition to excessive stress placed upon written statements, there was another tendency to unbalance, namely, because most Spanish and English books dealt with the Indians of Mexico and Peru, both the scholar and intellectual reader echoed the subject matter of books attracted by the ruins of highland Indian empire, which offered a more striking panorama for historians, travelers, ethnologists, and archaeologists.

Nevertheless, it became more and more usual for those societies interested in Latin America to turn to the South American continent for men and regions which might broaden the basis of ethnology and archaeology. One of the most effective ways of promoting such ties was to give new life to an old inter-American tradition and to advance cooperation by exchange relations with Latin American societies, as well as the nomination of leading Latin American ethnologists to membership in North American societies. In Philadephia, New York, and Boston, men of scientific inclination realized again that to know Latin America it was necessary to enter into direct relations of a cultural sort. The first North American society to launch and stabilize these contacts was the American Philosophical Society in Philadelphia.

The long service to Latin American studies and inter-American cooperation rendered by this Society is but a part of Philadelphia's role in the total picture of such cooperation. But the Philosophical Society took the lead, from an early date, in furthering investigations and gathering materials upon Indian linguistics as a large part of its interest in New World origins. A more important result of its work led to the enlistment of Latin Americans as correspondents who would (and did) contribute to the Society's publications and aid its researches. Thus, the first Latin American ever to be named to membership by a scientific society in the United States was Alejandro Ramírez, a scientist and official of colonial Guatemala, elected in 1801.

Thirty-five years later, in 1836, the American Philosophical Society, in its search for materials dealing with Indian antiquities in Central America, turned to Guatemala again. Five years before John Stephens had run across the Maya vein and an archaeological rush pushed Yucatan before the world, the Philosophical Society, in its eagerness for intellectual cooperation, had already begun to reach into the enormous bowl of Guatemalan ethnological riches. It is interesting to reread the letter sent to the Philosophical Society by Manuel Gálvez, President of Guatemala, a student of Indian civilization, corresponding member of the Society, and an associate of that Juan Galindo who was to contribute articles on Guatemalan ethnology in North American scientific journals.

"Guatemala 31st May 1836.

"Sir:

"I have had the honor of receiving your esteemed letter of the 21st of July of last year. I regret very much the delay that it has experienced on its way hither, as well because I would not wish that my Silence should be considered as a want of attention on my part, as on account of the interesting nature of the Subjects to which your letter refers— It is advantageous to a Country like ours, that wants only to be better known abroad, to hold a correspondence with an Officer of learned Societies, and we consider it as an object of importance, while at the same time, it will contribute to enrich your fund of knowledge, by the information which your members will receive of our antiquities, statistics, natural history &c.

"I am preparing a Collection of printed Documents, which I shall transmit to you by the first opportunity. I have already written to the Acad-

emy of Sciences, established here in 1832, in consequence of a decree issued by me as Governor of this State, not only that they should transmit to you the MS Grammars of Indian languages which are, no doubt, in their public library, but also that conferring upon you the title of their Corresponding Member, agreeably to their Statutes, they may carry on with you a Correspondence which, no doubt, will prove advantageous to this Country."

Grammars, dictionaries, and vocabularies went up to Philadelphia, ties of inter-American correspondence were established without government assistance, and resources in the United States on Indian linguistics were enriched. All throughout the American continent, the work of the American Philosophical Society won a regard and esteem that eased the way for researches and inter-American contacts by other societies.

Latin American ethnologists and Indianists were attracted to membership in North American groups, and almost every worthwhile scientific and learned body in the United States moved away from a supposed and mythical provincialism, towards an inter-Americanism based upon exchange of publications and corresponding memberships. It is, therefore, not surprising that the American Ethnological Society, soon after it was founded, should follow the pattern of the Lyceum of Natural History, the New York Historical Society, and the American Philosophical Society—to name only a few.

The Ethnological Society held its first meeting in 1842, and within twenty years (by 1863) there were at least seventeen known Latin Americans who had been invited to membership. In this brief, first epoch of its existence, the Ethnological Society also realized the importance of reaching into Latin American countries for supporters and correspondents. Moreover, a cross-section of its membership shows that Latin American ethnology was fairly well represented by men coming from outside of Central Mexico and Peru. The names of some leading contemporary ethnological workers in Cuba, Guatemala, Colombia, and Ecuador are revealed in addition to members from Mexico and Peru. Cuban and Colombian antiquities and ethnology were added to those of Yucatan. These steps were among the first to be taken in extending anthropology and archaeology to the whole continent, but some time had yet to pass before Brazilian aboriginal history was included. In general, Peruvian, Yucatecan, and New Granadan tribes held out the most attraction—always excepting, of course, the interest in Mexico.

The index of new directions in inter-American ethnological relations may be found in the list of Latin American members of the American Ethnological Society, as its share of cultural cooperation:

José de la Luz, Cuba, 1861
Andrés Poey, Cuba, 1861
José Barrundía, Central America, 1852
Modesto Flores, Central America, 1861
Colonel Codazzi, New Granada, 185?
A. P. Herrán, New Granada, 1845
José Obaldía, New Granada, 1861
Tomás C. Mosquera, New Granada, 1861
Ezequiel Uricoechea, New Granada, 1861
Vicente Rocafuerte, Ecuador, 1845
F. Villavicencio, Ecuador, 1861
Tomás E. Carrillo, Yucatan, Mexico, 1845
Juan Pío Perez, Yucatan, Mexico, 1845
José Pacheco, Mexico, 1863
José F. Ramírez, Mexico, 1845
Manuel Gomez Pedraza, Mexico, 1845
Mariano Rivero, Peru, 1845
Pascual de Gayangos, Spain, 1845

It should be remembered that, in the nineteenth century, there was a close affinity between history and ethnology, especially in connection with the origins and antiquities of the New World. Very often, it happened that Latin American ethnologists and Indianists, who might not be members of the American Ethnological Society, joined the work of other societies as correspondents and contributors of articles. Such was the case (to take but one example) with Juan Galindo, a member of New York and Massachusetts Historical Societies and a contributor to the American Philosophical

Society, but not a member of the Ethnological Society.

It would also be hard to say whether knowledge about Latin American Indian civilization was pushed more strenuously by historical groups than by ethnological. In New York as well as in other cultural and scientific centers of the United States, history, antiquities, and ethnology were fairly well joined. At least, most educated persons interested in one subject followed progress and discovery in the others. Few people, for example, were more persistent supporters of Dr. Carl Behrendt's work in Maya language and Yucatecan ethnology than was John Russell Bartlett, secretary of the New York Historical Society, the American Ethnological Society and, later, librarian of the John Carter Brown library with its rich possessions dealing with Latin America.

Latin American archaeologists, ethnologists, and historians who were corresponding members of the New York Historical Society have been listed elsewhere. Bartlett was among the first to extend its chain of membership down into Brazil, as will be seen. He was not much different in his acceptance of the mutual assistance pact between Latin American ethnology and history from George Gibbs, of the same two societies and later a stalwart supporter of the Smithsonian's work. The discovery of the Maya had widened the so-called provincial limits of the New York Historical Society. The nomination of Manuel Alonso Peón of Mérida, Yucatan, alongside the names of many other Yucatecan and Latin American ethnologists and archaeologists is one illustration of how that historical society followed up a fine chance to participate in Central American researches. Gibbs soon acknowledged from Peón a shipment of "curiosities" from Yucatan, but another letter from Gibbs to Bartlett shows how purposeful was the large aim of the New York Historical Society in contributing to the history of Maya civilization.

[prob. 1848.]

"Dear Bartlett:

"Enclose these resolutions in a letter to Don Manuel Alonso Peon of Merida Yucatan stating that you have been informed by Mr. Jas. R. Hitchcock that he is the proper person to whom to convey the respects of the Society. Also have a diploma for Peon ready as corresponding member, and mention that in your letter that we shall be glad to receive from him any documents or antiquities, and any information as to the country, particularly works on the *Maya*. . . . Tell Peon that at a suitable opportunity when peace comes you will send him our collections.

Geo. Gibbs."

The inter-American work of the New York Historical Society, it can be shown, was matched by the American Antiquarian Society, whose ethnological members from Latin American began with Juan Galindo, nominated in 1836, continued with Yucatecan members during the rest of the century, and reached a peak with the selection of Juan Ambrosetti and Samuel A. Lafone Quevedo of Argentina, in 1910. These direct connections, supplemented by exchange of documents, "curiosities," and valuable museum materials, helped to reduce the influence of literature and book descriptions upon ethnologists. But the wealth of printed accounts by travelers, missionaries, and chroniclers was not to be wasted. Indeed, the growing number of books gave rise to some useful summaries of existing knowledge. One of these résumés is Albert Gallatin's *"Notes on the Semi-Civilized Nations of Mexico, Yucatan, and Central America,"* first published in the *Transactions* of the American Ethnological Society, but also separately printed. Gallatin, president and chief benefactor of the Ethnological Society, brought together in one place the judgments of Spanish historians, some of Prescott's views, and the more recent revelations of John Stephens.

Literature and language always go together, and the literary approach of Latin American ethnology in the United States is clearly evident in the study of Gallatin. Confining his attention to the

same tribes of the central Mexican plateau which had always been a focus of study, he reviewed the Mexican number system, calendar, and other inventions, but gave special emphasis and attention to the philology of the Aztec language. He had little interest in, or knowledge of, the Indian of northern and southern Mexico. The study of vocabulary and Indian grammar, already undertaken by Duponceau for the American Philosophical Society, was a subject of wide interest, and Gallatin's monograph aided in tying ethnology to languages. The stress upon folklore, legend and myth was to come later, but ethnology, like history, reflected the humanist traditions of Western Europe and, to a large extent, became a branch of literature. Letters and history, and letters and ethnology, were paired in that way.

It was hoped that the structure of language might lead to the essential unity of language, and because of this, missionary interest in grammar added greatly to the search for grammars and a linguistic key which would make it easier to reach the native. The missionary, however, was usually a field worker and his use for language had to be practical. The search for the one world of American man through a common stock of speech left a mark upon ethnological studies which had the humanist, bookish interest of the Renaissance heritage on one hand, and, on the other, the related admiration for the laboriously compiled grammars and dictionaries of the Spanish missionaries. The Trustees of the Astor Library made their collection of Indian grammars an emphatic point in their report to the New York State Assembly (1853), stating that their collection, which was later to become the New York Public Library,

"has also the best of the vocabularies of the different dialects of the Mexican and South American Indians, which were collected and published by the early Spanish missionary priests. Books of this last class have become excessively rare and consequently dear. A perfect copy of Molina's *Arte de la Lengua Mexicana* cannot be had for less than fifty dollars; and Rincon's *Grammar* of the same language, a mean little duodecimo, bound, or rather, done up, in a limp vellum, which few would accept as a gift, costs much more than its weight in gold."

Not all American workers in Indianist ethnology, however, were in agreement as to the importance of language and philology. Some felt that language was an instrument, rather than an end; others found that architecture was a better index; a few agreed that the physical appearance of man threw much more light upon the Indian past. On the subject of classification of Indians by physical measurement, no one was more certain of the defects of linguistics as compared to cranial structure, than was Dr. Samuel G. Morton, of the Academy of Natural Sciences at Philadelphia. Morton, a medical man, approached the problem of the unity of the American Indian from a physical-anatomical viewpoint. His search for crania and his researches into measurement brought him fame, specimens, and correspondence with Latin America. His conclusions led him to disagree sharply with the philologists, and, in a letter of 1847 to John Bartlett of the American Ethnological Society, Morton declared flatly,

"You may rely upon it, philology, however important in Ethnology, is not infrequently a broken reed."

The blow at the linguists was coincident with the strengthening of Latin American prehistory through the rise of Latin American archaeology as an explanatory study of the Indian past.

At the same time that Gallatin was summing up the known linguistic ethnology of the Nahuatl stock in Anahuac, John Stephens lived with the Indians of Yucatan in the shadow of the old ruins, and Brantz Mayer went out many times to see the remains of the ancient architecture of the Valley of Mexico. Archaeology was to have its say about the nature of Indian antiquity and the possible

unity or manifold variations of man in America. American prehistory—without books or written accounts—supplied new sources of knowledge, inter-American interest, scientific debate, and cultural cooperation. The apparently sudden introduction of the scholarly world to the ruins of the Maya was combined with the renewal of interest in Aztec and Peruvian architecture alongside of the study of Indian languages.

Language, nevertheless, had great importance in bringing about cooperative study of common origins. White civilization in North and South America, which varied so much in speech, government, and culture, had to turn to the Indian for evidences of unity in the New World. Linguistics and architecture were parallel pillars which supported knowledge. Both archaeology and ethnology could have made use of language studies, although not perhaps to the exclusive extent then in vogue. All the same, there is something to be said for direct experience as required by archaeology; field observation seems to have prevented Latin American ethnology from becoming an adjunct of library research.

When travel opportunity permitted Americans to become familiar with Mexico through first-hand experience, long residence, and immediate research, there was no doubt that field ethnology, archaeology, and cultural relations gained considerably. But the hold of literary ethnology was strongly maintained for a long time. There was a general feeling that the Indian in his nineteenth century circumstances was only a poor (and uninteresting) copy of the original who had been so impressively described by historians and eye-witness observers two and more centuries before. If we take as an example of this state of mind the notices of Joel Poinsett in his *Notes of Mexico,* or those of Dr. William Keating (a resident of Mexico), we find that both of these men took a greater interest in the visible remains of Aztec monuments than in the living groups of Indians around them. The same can be said of Brantz Mayer, who set off the value of architectural archaeology against linguistic ethnology, but only insofar as it threw light upon the past, instead of the present.

Strangely enough, history and sources, whether literary or monumental, were intended to describe origins and the past, rather than to explain the present by means of the past. This reverse directional trend, which turned away from those influences exerting change upon Indian life, made it possible to link Latin American history with ethnology where primary written sources were involved, but had the inevitable effect of retarding the growth of field observation. Progress was very slow from the time of Benjamin Smith Barton to that of Daniel G. Brinton, a century later, in the process of study of the present-day Indians.

However, one of the effective ways of overcoming excessive dependence upon books was to tap the scientific personnel of Latin American ethnology and bring leading authorities into membership in North American societies. The archaeological discoveries of the Maya in Yucatan not only stirred public taste and interest, but opened the way for the American Ethnological Society to choose as its earliest members the Maya specialists, Juan Pío Perez and Tomás Carrillo. It is thus true that Latin American archaeological interest gave new life to those societies interested in the Indian, but the re-discovery also renewed an older difficulty by concentrating upon dramatic and colorful monuments in Mexico, Yucatan, and Peru, which could prove the advancement of the American Indian civilization to a plane somewhat comparable to those recently found in Egypt and elsewhere in the Middle East. While this concentration of effort brought about an increase of knowledge concerning the major cultures, its long-range

effect was to hold back from continental horizons and to make investigation excessively regional.

In the general awakening of interest in Yucatan, no one can question the service of Stephens, but no one ought to deny a rightful share of credit to a little-known contemporary, Benjamin Moore Norman, of New Orleans. While Norman was "rambling," as he calls it, through Yucatan and the Maya country, he ran across the ruins and set down on paper some useful field descriptions of Chichen-Itzá and Uxmal. His book, *"Rambles in Yucatan; or Notes of Travel through the Peninsula, including a Visit to the Remarkable Ruins of Chi-chen, Kabah, Zayi, and Uxmal,"* first appeared in 1842, the same year in which the American Ethnological Society held its first meeting. Norman, a most alert and intellectually astute "tourist," became as enthusiastic about his findings as did John Stephens, and brought his discovery to the attention of Dr. Francis Hawks in New York City.

Dr. Hawks was many things to many men: a theologian, student of Spanish literature, translator of the Rivero-Tschudi account of the Indians of Peru, historian, geographer, and ethnologist. He was an influential member of the American Ethnological Society, the New York Historical Society, and the American Geographical Society, all of which had an interest in aboriginal antiquities in Latin America. The "idols" and statuary which Norman shipped to Hawks in New York were as important a collection of objects as the Mexican material which Joel R. Poinsett had earlier given to the American Philosophical Society. Far from the world of scholarship, societies, and institutions, Norman, in his own way, had given that world a first-hand sketch, plan, and survey of the Chichen-Itzá ruins. Though he still sought the support of learned societies, he contributed as an intelligent traveler to a field in which the names of Stephens and Squier rank much higher. This is probably the reason why he wanted the backing of Dr. Hawks, to whom he wrote in a letter dated New Orleans, April 25, 1850:

> "I have shipped my collection of Idols etc to New York, but I have not yet fully decided what to do with them; this will be a matter requiring your action which I shall avail myself of when I have the pleasure of meeting you again. The arrival of the idols in New York will afford a good opportunity to revive the subject of American antiquities."

Where these objects were ultimately deposited is hard to say now. Like the specimens sent to the New York Historical Society by Manuel Alonso Peón, they probably exist in one of the City's museums or have been destroyed. Norman's efforts remain obscure, and the contacts he initiated were taken up by the historical and ethnological societies.

Norman had believed that Hawks, knowing Spanish and interested in aboriginal America, would write or promote a study upon "American Antiquities." While Hawks knew as much as anyone about Latin American ethnology, the work never appeared, and the analysis of the American past was separately initiated by Brantz Mayer, historian, diplomat, and archaeologist. Mayer worked on Mexican (that is, Central Mexican) architectural remains. Of Baltimore background, he had been assigned to the Mexican Legation some years after Joel Poinsett had left and some years before Buckingham Smith, another student of Mexican history and ethnology, was assigned to that Legation. Mayer's interest in Mexican antiquities dates from his residence there, and he took up very seriously the task of learning about the country to which he had been assigned. He was one of the first Americans to sense intelligently the Indian element as part of national Mexico, yet his views differed from those of the ethnologists and historians.

To Mayer, both written record and living descendant meant much less than art and architecture as broad chronological and cultural indices of pre-Cortesian Mexico. His judgments were far more confident than the hesitant conjectures of Norman, with an emphasis on archaeology just as strong as the linguistic stand taken by Gallatin in his *"Notes."* As far as Mayer was concerned, the bookish source and the linguistic ethnologist lacked a great deal compared to the vivid record of architecture. Unlike Prescott, Brantz Mayer lived and traveled in Mexico, and was one of the earliest North American correspondents of the respectable *Sociedad de Geografía y Estadística.* A historian of Mexico in his own right, Mayer's view, which fell upon deaf ears, was that the lamented loss of Mexican and Maya books, that is, the codices, did not in any way undermine knowledge of Indian civilization. He was convinced that the so-called codices and the "hieroglyph" documents were in no way historical, but rather *aide-mémoires* useful only in so far as they once suggested to native experts the dates, monarchs, and place-names of their past.

Boldly departing from the strong interest of his day in philology and linguistics, Mayer hinted that the latter trend was but an echo of 19th century romantic interest in ballads, grammar, folk-lore, and supernatural tales. This could not supply a stable and reliable source, and while it might be of interest to an ethnologist concerned with myth, he held that archaeology alone, recording the permanent contribution of aboriginal architecture, gave a unique key to the Indian past.

For some time to come, the work of Mayer, Norman, Stephens, and Squier continued to stir scholarly and public interest, but at the same time ethnology held its own in the study of Indian culture. The undiminished concern of Latin American ethnology for New World man owes much to the work of the American Ethnological Society. Ethnology faced a hard task if it wanted to hold its own against research into the more impressive monuments of Mexico and Peru, and include the antiquities of an entire continent. While its success was slow in this displacement process, success nevertheless did come. The Society began to take notice of ethnological and archaeological regions outside of Mexico and Peru, and to survey the civilization of all Latin America.

The secretary of the Society, John Russell Bartlett, reviewing the progress of ethnology in 1843, brought to view a good deal about investigations in all of South America. Although Bartlett kept up the good tradition by never seeing Latin America himself, he did much to distribute interest by directing it to Indianist work in Chile, Argentina, Peru, Venezuela, and Brazil. Not only did he bring the American Ethnological Society into official, institutional relations with Brazilian ethnology, but he also brought the attention of Americans to the Castelnau scientific expedition, then crossing the Matto Grosso from Sao Paulo, en route to Bolivia.

Combining archaeology with ethnology, the early *Transactions* of the Ethnological Society opened the door to the rest of Latin America with such articles as:

> (1) An account of certain antiquities, chiefly stone implements found in Brazil. . . . By Virgil von Helmreichen of Rio de Janeiro.
>
> (2) On a collection of Peruvian antiquities in the Cabinet of Senhor Bartoza of Rio de Janeiro. By Thomas Ewbank.

Of course the Society could not afford to turn its attention away from the "diversity of languages, the remains of ancient art, and traces of ancient civilization in Mexico, Central America, and Peru." That would have done no good, and defeated the purposes of ethnology as well as archaeology. But there was also

still less reason why Mexican and Peruvian researches should lie at the core of Indianist studies, while lowland and woodland peoples continued to roam, in several senses, far from highland population centers, and along the periphery of archaeology and ethnology.

Any start, naturally, offered some progress away from excessive stress on the "big three" zones. Considering the number and complexity of the different peoples and cultures of Latin America, a surprisingly good beginning was made in the form of articles and reports about Nicaragua, Colombia, the Caribbean, and Brazil. It was E. G. Squier, much more of a scholar than Norman or Stephens, who revealed the possibilities of Nicaragua in his article entitled, *"Archaeology and Ethnology of Nicaragua,"* (Trans. Am. Ethnol. Soc. 3: 86-158). For the first time, American ethnologists had field information about customs, native industries, house architecture, language, and environment.

Besides nominating members from Colombia and Cuba, the Ethnological Society opened its pages to descriptions of the state of research in Colombia. Its *Proceedings* printed—for the first time in the United States—an account of the travels and observations of the noted New Granadan scholar, José María Vergara y Vergara. The Cuban corresponding member of the Lyceum of Natural History and the Ethnological Society, Andrés Poey, introduced to Americans the theme of "Cuban Antiquities." The rest of the Caribbean-Central American zone was surveyed, if not analyzed, by Berthold Seeman in his account of the *"Aborigines of the Isthmus of Panama."*

While it may seem from this that interest in the Caribbean and Central America lay unnecessarily close to regions of current economic and political value, there were real advantages in ethnological expansion. Any step away from Mexico and Yucatan inevitably had to lead to countries geographically contiguous, and it definitely advanced progress in Latin American studies. There were, as a result, wider possibilities of work and an attempt to bring about the "decentralization" of American Indian studies. The trend was remarkable not so much for the knowledge which grew as for new interests, contacts, and inter-American memberships it created.

More and more of Latin America came into the scope of the Ethnological Society's work. The Society was quite conscious of the great gap in knowledge in spite of conspicuous discoveries in Middle America. There remained a vast area of importance, described largely by European travelers. This new domain of ethnology was Brazil, and the Society began to turn its attention to Brazilian Indian studies. Here again, Bartlett, acting under the instructions of the Ethnological Society, and working together with the New York Historical Society, used his offices to bring about the first concerted and organized effort to make Brazilian ethnology better known in the United States. These proposals antedate by twenty years the expeditionary reports made by Agassiz and Hartt, and Bartlett should emerge from an ill-deserved anonymity for having opened direct exchange of publications and membership with the noted *Instituto Geographico e Historico Brasileiro* in Rio de Janeiro.

This year of decision and contact, 1846, although a year of war, did not stop the work of cultural cooperation. The New York Historical Society, already interested in Spain and Latin American archaeology and ethnology, encouraged the Ethnological Society's initial steps towards Brazilian friendships. It is true that, before this, individual Brazilians had been brought by the American Philosophical Society into the circle of inter-American corresponding membership, and this pattern of schol-

arly links continued with the Lyceum of Natural History, the Academy of Natural Sciences in Philadelphia, and the American Geographical Society. But it was still a little rare for American societies to seek to tie their work permanently and purposely to inter-American scientific cooperation. Certainly, such ties were new for ethnology in America.

As secretary of both the Ethnological and the Historical Society, Bartlett steered the interests of both towards an open door of cultural policy through which many noted Americans were to pass in the next hundred years. Intellectual reciprocity took on the outlines of its present shape when Bartlett introduced the work of American ethnology to Brazil. The *Revista Trimensal* of the *Instituto Geographico e Historico* (8: 153) described the cultural overtures:

"146th Meeting, March 18, 1846.

"Letter from Mr. John Russell Bartlett, secretary of the American Ethnological Society, in New York, inviting this Institute, with the compliments of that Society, to initiate a fraternal and literary correspondence, which will surely be of no small benefit to both societies, and in general to the promotion of science on the American continent. Together with his letter, Mr. Bartlett sends, for the library of the Institute, the first volume of the *Transactions* of the Ethnological Society, along with the following works offered by their authors."

This exchange, soon to be followed by the *Instituto's* own shipment to the Ethnological and other Societies, was the first of a long series of gifts and exchange of publications between Brazilian and United States groups.

The books which Bartlett sent down were those which he considered to be good specimens of North American work. They include:

(1) Alexander W. Bradford. *American Antiquities and Researches into the Origin and History of the Red Race.* New York: 1841.

(2) Samuel George Morton. *An Inquiry into the Distinctive Characteristics of the Aboriginal Race of America.* Philadelphia: 1844.

(3) Samuel George Morton. *A Memoir of William Maclure Esq., late President of the Academy of Natural Sciences of Philadelphia.* Philadelphia: 1844.

(4) William H. Hodgson. *Notes on Northern Africa, the Sahara, and Soudan in Relation to the Ethnography, Languages, History, Political and Social Condition of the Nations of those Countries.* New York: 1844.

(5) Benjamin M. Norman. *Rambles in Yucatan; or Notes of Travel through the Peninsula Including a Visit to the Remarkable Ruins of Chichen, Kabah, Zayi, and Uxmal.* New York: 1844.

At the March meeting of the *Instituto,* corresponding membership was extended to all the North American authors cited, and, on its own initiative, the *Instituto* sent to New York City for other copies of these works and a copy of John Stephen's *Incidents of Travel in Central America, Chiapas and Yucatan.* A final touch was given by beginning correspondence with the American Ethnological Society, and Albert Gallatin, its president, was made an honorary member of the Brazilian Society, while John Bartlett, secretary, was named as corresponding member of the Rio de Janeiro group.

In this way, by the beginnings both of interest and of research in continental America, the search for knowledge regarding Indian society led to inter-American ties with Mexico, Cuba, Colombia, Central America and, ultimately, Brazil. The horizons were now extended—even hemispheric—and large plans for consolidating cultural relations, to the point of calling inter-American ethnological congresses, were being advanced. While the war with Mexico, then going on, won few friends in Latin America, the pace and purpose of inter-American ethnological relations continued and, indeed, brought forth an invitation to Brazilian scholarship which constitutes enough of a landmark to be partially repeated here. The cited letter came before the whole membership of the Brazilian Society on October 29, 1846. It was preceded by the following which renewed the request for cultural relations:

"Letter from our corresponding member, Mr. John R. Bartlett, Secretary of the New-York

Historical Society, offering the *Instituto* in the name of that Society, the collection of its transactions during the year 1845, and declaring that it would greatly prize a correspondence with this Instituto, whose publications it will always receive with great satisfaction. . . .

"Another from the same gentleman, in his capacity as Secretary of the American Ethnological Society, in whose name he offers to the Instituto the first volume of its Transactions. He similarly expresses the desire of the Ethnological Society to enter into a fraternal correspondence with the Instituto Brasileiro, reciprocating the exchange of publications."

But Bartlett and the Ethnological Society had plans of longer range which would place this type of inter-American cooperation on a permanent footing of unity. He included in his correspondence a longer note, sent by his colleague Herman Ludewig of the New York Historical Society and dated, New York, August 25, 1846. The note was read to the membership of the Brazilian *Instituto,* and only the most important excerpts follow:

"Gentlemen:

. . ."A congress of all the historical societies of the American continent towards this important end [the history of the New World] could not fail to have the most happy consequences. Even if these historical societies only communicate reciprocally the results of their respective investigations we will already have advanced along one third of the way. Up to the present no one has paid attention to this, and Europe continues to centralise toward itself the efforts of even the most national-minded scholars of the New World. . . .

"May not the students of New World History hope that a brotherly and scientific association, that a mutual exchange of each other's publications, will soon come to replace this [aloofness]? That North and South America can assist one another's researches, whose results from now on be useful to both? That all Americans, finally, will make common cause in exploration of the historical treasures of their vast continent?

"The immense advantages of association supply us with a guarantee that these hopes, these desires are not far from fulfillment, and it is because of this belief that the New-York Historical Society and the American Ethnological Society are the first to extend a friendly hand to you in close scientific and fraternal relations. . . ."

The unity of history and ethnology in the Americas would have been the cornerstone of this Congress, had such an assembly ever come into being. Up to then, the connection between history, ethnology, and geography in Latin American research was a pretty close one. The method common to each was to approach the problem through literary sources, while interpretation was influenced by a mixture of romanticism, a universalist ideal, and the search for continental unity. As long as there was a shared interest in Indian origins and the aboriginal past, history in the 19th century was a blood brother of ethnology. However, history and ethnology fell away from this relationship due, partly, to the advancement of field method, as well as to the rise of nationalist historians in Latin America who were concerned with European institutions, laws, and government in America.

The elements of inter-American relations continued to be New World man, geography, and science, and it fell to anthropological science to try to re-establish at least an intellectual kinship in the New World. This was a hard task, no matter how much the learned and scientific societies had fastened the ties of inter-American cooperation. As much as individuals and societies stimulated the rise of cultural relations, the cost of exchange and the expenses of shipments were a financial strain. Nevertheless, the societies tried to retain as long as they could the advantages of direct exchange and communication with Latin American science. It is at this moment that the Smithsonian Institution entered upon the established cultural routes to Latin America, promoting inter-American scholarly exchange on a wide and highly reputable scale.

Although no inter-American congress of the learned societies of North and Latin America ever came about, still the Smithsonian, by following the exchange precedents of the Ethnological, the Philosophical, New York Historical and many other Societies, supported the aims of private learned groups with the assistance of government and gave new scope

to ethnology and archaeology in the Americas. The record of inter-American relations as a normal part of American science owes a great deal to the individual societies whose work has been described, but as much and more is owed to the Smithsonian Institution. The fact that the Smithsonian was created by Act of Congress did not impair relations in Latin America, because no other learned American group, unless it be the American Philosophical Society, has ever been as highly regarded by Latin American scholarship and science.

Since the ethnology of America was at that time a large part of the Smithsonian's interest, the trend of its efforts renewed the influence of philology and grammar. Moreover, Indianism continued to seek through language for evidence of unity of stock between English and Spanish North America. The Smithsonian, which did not create, but rather followed the accepted areas, patterns, and methods of study, took little cognizance of the ethnology of continental Latin America, or of Brazil. The importance of linguistics, therefore, attracted the Smithsonian to Mexican scholarship in this subject. But its *Contributions to Knowledge* and the *Transactions* were circulated widely in the hemisphere, and scholars and societies in Bogotá, Caracas, Santiago, Buenos Aires, and Rio de Janeiro knew of the work being accomplished by North American ethnologists.

It was in connection with the project on the *Handbook of the North American Indian,* and the preparation of linguistic maps of aboriginal Mexico, that Mexican ethnology entered into joint participation with the United States for the first time. The Smithsonian acted as clearing-house and sponsor. For example, in 1862 and 1863, the Smithsonian was directed by one of the most active proponents of inter-American relations, the celebrated physicist Joseph Henry. The excellent success of his efforts to bring the science of both Americas together is to be described elsewhere, but at this time he encouraged steps on behalf of ethnology. Not the least of his many helpful acts was to secure from A. J. de Irisarri, the Guatemalan poet and Minister to the United States, necessary letters of introduction for Dr. Behrendt's ethnological work in Yucatan and Central America. Behrendt, an assiduous correspondent of John Russell Bartlett, had received a grant from the Smithsonian to carry on investigations at Petén and Vera Paz.

But it was Mexican ethnology which continued to be the major lodestone and attraction. Dr. Henry, on behalf of the Smithsonian, could not stand aside from the Indianist riches of Mexico. As an object for study by archaeologists, historians, and ethnologists, that country was unparalleled in America. To advance knowledge about Mexico, it was necessary to go beyond the central valley civilization and find out something about the many other Indian languages, peoples, and tribes. Even some living ethnology had to be known. In this situation, the Smithsonian called upon Buckingham Smith, who knew Mexico, had studied in the Spanish archives, and had done some work on Indian philology in Northwestern Mexico.

Smith was in a position to suggest the name of his good friend, José Fernando Ramírez, as the most competent director of the Mexican part of the proposed *Handbook.* Ramírez, it may be added, was already well enough known in the United States to have been appointed a corresponding member of the American Ethnological Society, the New York Historical Society, and the American Antiquarian Society. It was with regard to this point that Professor Henry was addressed by George Gibbs, secretary of the New York Historical Society, whom we have already seen to be interested in

Yucatecan investigations. In writing about the *Handbook,* Gibbs's letter shows how far the inter-Americanism of linguistic ethnology had been developing:

"January 21, 1863.

"Mr. Buckingham Smith called on me today and showed me a letter from Don José Fernando Ramirez, of which I enclose an abstract.

'There exist no vocabularies of the languages nor have the grammars ever been preserved, written by the early missionaries. It is almost impossible to bring together those that have been printed. On this subject a work has been commenced entitled *Cuadro Descriptivo y Comparativo de las Lenguas Indigenas de Mexico,* by Don Fernando [*sic* for Francisco] Pimentel. The first volume only has been printed which comprehends the analysis of twelve languages. Unfortunately material is wanting. Those contained in the first volume are the Huaxteco, Mixteco, Mame, Othomi, Mexican, Zapoteco, Tarahumar, Tarasco, Totonaco, Opata or Teguema, Cahila, and Matlaznica. If you have succeeded in publishing the grammars about which you informed me [Buckingham Smith published the Pima and Esleve grammars in collaboration with John Gilmary Shea], and they should arrive in time, they will be examined in the work.

'I have not seen and am unacquainted with the *Archaeology of the United States,* by Samuel F. Haven, about which you write me. Of the Smithsonian *Contributions* I have only the second, third, and fourth volumes, unless the first volume should be the *Ancient Monuments of the Mississippi Valley* [Squier] which I possess. At present there is no way of sending books to Mexico unless the Department of State will take charge of them.'

"Mr. Smith has handed me the above with the view that I might ask of you to send to Señor Ramirez such other papers of the *Contributions* as belong to archaeology. That gentleman is well known as one of the most distinguished scholars in that department in Mexico, and one whom it would be desirable for the Institution to number among its correspondents. I am, however, astonished at the account he gives of the paucity of works on the indigenous languages of that country, so entirely opposite to our general belief here. Under any circumstances, Pimentel's work should be procured, if possible."

This single example is sufficient to indicate the entrance of the Smithsonian into inter-American ethnology. The Institution's aid was important, but it followed an already existing path. Not was this was unusual; in fact, very few had up to then thought to look to geology and paleontology in the rest of Latin America for understanding of American prehistory. The golden sun of Cuzco and Tenochtitlan threw deep shadow and eclipse on the rest of Latin America, in spite of several attempts to enter into research contact with that part of the continent. The word-riches of philology, likewise, were as bright as they were obscuring. Thus, it was long overlooked that the rest of America also had a past, not recorded in pictograph or glyph.

John Bartlett, for the American Ethnological Society, had forced some exceptions to this emphasis upon Mexico and Peru. In addition to the cited efforts to establish organizational ties, he encouraged correspondence—later published—from Virgil von Helmreichen of Rio de Janeiro, who had been among the Indians of the Serra do Espinhaço in the Rio Sao Francisco Valley and gave the Ethnological Society information (together with his own drawings) of artifacts, idols, rock paintings, shells, etc. Since the present-day Indians no longer made those objects, Helmreichen submitted the view (as Charles Hartt was to do for the Amazon) that an older civilization had once inhabited those places of Brazil.

But the intellectual father of effective North American scientific interest in Brazilian antiquities was Charles Frederick Hartt. Canadian by birth, but American in training, Hartt went on to do what Bartlett and Ludewig had outlined in their Brazilian correspondence twenty years before. Cut off by yellow fever at the age of 38, Hartt, originally a geologist serving under Agassiz, became the first trained American to become interested in Brazilian ethnology and Indian antiquities. He had combined geology with paleontology in the Amazon and Sao Francisco Valleys, and went on to separate the study of the Brazilian past from charlatans and superficial students. It was his feeling that in the Amazon and Rio Sao Francisco Valleys lay evidence of old earth strata, together with the vestiges of ancient culture. Far

from the highland culture to the west, Brazilian human and natural history could be integrated through ethnology and paleontology.

Hartt's former students write of him that he

> "busied himself studying Munducurú and Maué dialects of the modern Tupí language of the Amazonas, and in bringing together for the first time the stories and myths which are current in the tribes. He [had] prepared a large volume on the grammar, vocabularies and stories of this language, which yet [1878] remains unpublished."

His grammar and dictionary of the Tupí (still unpublished) was given by his wife to the *Museu Nacional,* of which he was the first North American to have been Assistant Director. Of his other contributions, his manuscript notes, rich in observed field data among Amazon tribes and archaeological finds at Bahia and Pará, have not been published, nor his projects for study of Brazilian antiquities and mythology. Some of his works on Indian pottery, rock inscriptions, myth, and native cemeteries were published in the *American Naturalist,* the *Archivos do Museu Nacional* (Rio de Janeiro), or as slender booklets. His work on the Botocudo was reprinted in his best-known book, *Geology and Physical Geography of Brazil,* recently re-issued in Brazil.

Hartt was very well known and highly regarded in his lifetime both as a geologist and an ethnologist. It is strange that his manuscript materials have never been published. As a geologist, he trained several Americans who won fame for their Brazilian work, one of whom took over his post in Brazil. But as an ethnologist his death cut off an effort which would have increased knowledge, and his eyewitness and field studies of the Indians, presumably on file in the *Museu Nacional,* were never used by others.

Fortunately, his unique position with the Brazilian government, his office in the *Museu Nacional,* and his own contributions gave him the reputation which won for him financial aid from the Peabody Museum of American Archaeology and Ethnology. By this time (1870), the Peabody Museum had begun to support and aid research in Latin America, having given a grant of $352 to Dr. Behrendt for Central American and Yucatecan ethnology (1860), and to Porter C. Bliss, corresponding member of the Mexican *Sociedad de Geografía y Estadística,* the sum of $250 for research in Mexico during 1871. The directors of the Peabody Museum did not hesitate to grant Professor Hartt $500 at one time (1872), and $600 in 1875 for his Brazilian studies. The Peabody grants to Hartt must be considered as the first grant-in-aid for anthropological field work in Brazil, and as another long step towards North American recognition of Brazilian ethnology.

Hartt, who had worked very closely with Brazilian colleagues in geography and ethnology, and who recommended these associates to membership in United States scientific societies, did a great deal of work to establish the validity of the single origin of the American Indian. American Indian civilization was not polygenous—as his former chief, Agassiz, thought—but was a product of American soil. This thesis, championed vigorously from the earliest days of inter-American interest, now rested for the first time upon the additional proof of geology and paleontology, whereas its earlier support had been largely literary and speculative. And Hartt, in keeping with the idea of progress, also held that Botocudo skulls, however primitive the ethnology of that people, did not represent any degeneracy from the assumed *Urmensch* of the New World.

It was in his report on *"Ancient Indian Pottery of Marajó, Brazil,"* that he made his position clear. He had found his pottery and mortuary urns lying in mounds on Marajó Island in the Amazon. His summary follows:

"We have no historical records of the tribe that built the Marajó mounds. . . . We have no record of the existence of any tribe in the Lower Amazonas that buried its dead in jars. I do not feel like coinciding with von Martius in the supposition that the Marajó mounds were made by Indians of Tupí descent. There are many resemblances between the pottery of Marajó and that of Peru and North America that will be worth study. I hope that future explorations will enable me to clear up much more of the doubts expressed in this paper and cast much needed light on the ancient races of the Amazonian Valley."

In separate papers and articles, Hartt added more certainty to this opinion. His study of the rock inscriptions on the Serra do Ereré on the Tocantins, and those of the Rio Sao Francisco were checked against literary descriptions made in the 18th century. He became more and more convinced that the Tupí had displaced an earlier people, probably were civilized. The Tupinambá succeeded the people of mounds, burial urns, and rock markings.

Hartt wrote several articles which he hoped would bring about more public and scientific interest in Brazilian ethnology. Considering what Bartlett and the Ethnological Society had tried to begin years before, it is interesting to see how Hartt repeated the problem (quoted from *American Naturalist*, 1871):

"It is a great shame that the antiquities of Brazil have so far received little or no attention, yet the country is one whose ethnology is extremely interesting and it is very desirable that the history of its many tribes should be traced out. The neglect of Brazilian antiquities has arisen, no doubt, from the comparative rarity of the relics and the difficulty of exploring the country. Stone implements are found all over the Empire, ancient pottery occurs in many localities, especially in burial stations, and Kjökkenmöddings [sambaquies] exist on the coast as at Santa Cruz in the Province of Espiritu Santo, on the Bay of Rio de Janeiro, at Santos, and elsewhere."

The initiative in this work, however, rested upon only one individual, and no American ethnologists came in to take over from where he had left off. It took a long time before the empty spaces in Brazilian antiquities were filled in by Americans. The reasons for this lie in the situation back home in the United States, where interest was directed to the Southwestern and Western Indians, Mexican archaeology, and the ever-important study of linguistics.

Years of effort and labor in the field of Indian grammar and language were now ripened by the study of native myth, legend, and literature in connection with aboriginal civilization. At the University of Pennsylvania, a Chair in American Archaeology and Antiquities supplemented the name and aim of the Peabody Museum at Harvard. The universities of North America took up the problem which scientific and scholarly societies had opened to inquiry and started to pursue. The Chair at Pennsylvania was held by Daniel G. Brinton, whose interest in myth, literature, and linguistics was almost exclusive with him. Brinton attempted to synthesize the grammatical and philological systems of aboriginal America into a literary picture which would describe the history of the civilization. Again, language and literature went hand in hand as main factors in Indian history.

Brinton's emphasis on myth—although he lacked the social and psychological insight brought to this approach today—brought on him criticism for ignoring field ethnology and relying too heavily on books and their writers. His views, in spite of this, were strong and certain, probably because he was well read in the language of the Spanish and native authors on Mexico. Although he drew up linguistic maps of the Chaco and other South American groupings, his main concern was with Mexican and Central American civilization.

But by this time, American ethnology had other workers who were not limited to bookish accounts and library opinions, who traveled widely and resided in northern as well as southern Spanish America, although not in Brazil. Adolphe

Bandelier was such a field worker, yet he was just as much at home in the Spanish literary sources dealing with aboriginal culture and, especially, native society. He held strong opinions on the damaging influence of Brinton upon American Indian studies. What he had to say can be summed up as the criticism of a century of ethnological method:

> "Santa Fé, New Mexico, January 1885. ..."what Dr Brinton has to say . . . has not much to signify. He is a very worthy, active, and industrious man, but only a reader and writer. American aboriginal history has never entered into his flesh and bone through practical experience. So it is the case with many, they gaze at things from an easy-chair, cite the nation before them into an elegant study, and when he is seated (after they have washed, combed, and perfumed him), they question him, carefully noting what he has to say. In this manner they study Ethnology! Archaeology is gathered from specimens only, and not a moment's attention is devoted to the condition under which they are found as well as to their relations to the country where they have been used. . . ."

While the method and conclusions of Bandelier are themselves open to criticism, this is not the place for their discussion. By the end of the century, and after, the technique of ethnological approach was to be made somewhat clearer and more certain.

The historical fact is that interest in Latin American Indianism had come to be permanent in the United States, after a century of growth and ripening of method. In a certain sense, anthropological pan-Americanism is probably the oldest form of our intellectual interest in Latin America. Curiosity about the origins and nature of the Latin American Indian brought it into being during the 18th century as part of the common setting shared by both Americas, but it was an active search for contact with the minds and societies of Latin America in the 19th century which gave it direction, organization, and inter-American unity. The matter of method, and the clarification of ideas of approach to Indian culture as a technique, never stood in the way of the hemispheric association of ethnologists. Whether emphasis lay upon grammar and linguistics, archaeology, or field ethnology, the joints of mutual relations held the cooperative structure together. Anthropology, history, and archaeology, in probing far back into the past for the possible unity of man in America, thus contributed considerably to the cultural unity of the present.

SECTION OF PHYSICS AND CHEMISTRY

DIELECTRICS AND RHEOLOGY OF NON-AQUEOUS SUSPENSIONS

By ANDRIES VOET*

The microscopic and electron microscopic methods of investigation of suspensions of finely divided materials in liquid media have not given a deeper insight into the mechanism of particle agglomeration or deflocculation, primarily due to unavoidable differences between observed preparations and actual concentrated suspensions.

The rheological behavior of concentrated suspensions, often characterized by plasticity and thixotropy, made it clear that, generally, particle structures were formed or broken up upon variation of the shearing stresses to which the systems were subjected. A proper interpretation of rheological data at low shearing stresses, however, remains doubtful, due to the phenomenon of plug flow, while nothing at all can be said of the rebuilding of previously destroyed particle structures at complete rest.

The present investigation is characterized by the simultaneous measurement of dielectrical and rheological properties of suspensions at lower as well as at higher shearing stresses and by the measurement of the progressive dielectric changes occurring in the systems observed. Experiments are reported with dispersions of particles having a relatively high dielectric constant, such as metals, carbon black, titanium dioxide, etc. These systems were studied first, since the effects found were numerically larger and afforded a simplified mathematical treatment.

It was found that the dielectric constant is lowest for spherical particles. From dielectric data, a form factor could be established which proved to be a constant for each pigment, indicating the degree of deviation of the particle shape from the spherical form. In addition, an agglomeration factor was introduced which was indicative of the degree of agglomeration of particles at each concentration and at each shearing stress. By measuring dielectric changes in dispersions at rest, the progressive change in formation of particle chains could be followed.

The dielectric method of investigation appears to be more sensitive than the rheological one, and changes in particle structure which were completed in less than one second could be observed.

As a result of a number of experiments, it was established that plastic systems are all thixotropic, although the time factor is often too short to be detected rheologically. In addition, systems which show newtonian flow are characterized by the absence of particle agglomeration. Finally, it was found that particles which differ very markedly from the spherical shape, such as leaflets of metals, needles, etc., orientate under shear. The time factor involved in the changes from random distribution to the state of orientation of these particles, and *vice versa,* gives rise to orientation thixotropy.

The quality of a vehicle, to promote the dispersion of a specific solid, often called "wetting and dispersing characteristics," appears to be the power to prevent particle agglomeration. It may be quantitatively estimated as the highest concentration of the dispersed phase at which only single particles exist. Its value may be found from dielectric data at various concentrations and shearing stresses.

In the study of the phenomenon of thixotropy, the dielectric method appeared to be of importance. The so-called "false body" type of thixotropy, characterized by a comparatively short time

*J. M. Huber Corporation, Brooklyn, N. Y. This paper, illustrated by lantern slides, was presented at the meeting of the Section on October 24, 1947.

factor and by large dielectric changes, appeared to be due to particle agglomeration.

Another type of thixotropy, characterized by a long time factor and by large changes in consistency, was found to exhibit only slight dielectric changes. Its thixotropy must be ascribed to the formation of a "tactoid" structure, in which particles are immobilized in a vehicle as a result of minima of potential energy at a distance, without forming actual contact.

There are a number of practical applications which make the dielectric method a valuable analytical tool. Thus, a carbon black of any type can be easily identified by its form and agglomeration factors in a specific vehicle at a specific concentration. Since the agglomeration factor is indicative of the forces acting between the particles, its value is of importance for the carbon black characteristics in any liquid or solid dispersing medium. A very considerable variation for different types of black has been found.

The concentration of a known carbon black may be estimated accurately in a few minutes, in a dispersion of a vehicle of known dielectric constant—a procedure consuming time and inaccurate by conventional analysis. The dielectric method distinguishes immediately between densified and other types of the same carbon black, which is rather difficult to carry out by other methods.

Finally, the degree of dispersion of incompletely dispersed blacks may be found quantitatively from dielectric data.

The method of measuring dielectric changes simultaneously with rheological data has its application in other fields, such as, for instance, with high polymeric or high-molecular liquids or solutions of high-molecular substances. As an example, an investigation was made of the so-called thixotropic phenomena observed with heavy hydrocarbon oils at high shearing stresses, reported several years ago and ascribed to orientation of the particles of the liquid at very high shearing stresses.

Since orientation of molecules will give rise to a decreased dielectric constant, various heavy hydrocarbon oils were studied at very high shearing stresses, up to 2.10^5 dynes per cm.[2] A decrease in dielectric constant of several per cent was observed, indicating that orientation actually occurs. These changes, however, are instantaneous and reach their final value within a fraction of a second, for increasing as well as for decreasing rates of shear. Consequently, the actually observed gradual decrease of the shearing force at high rates of shear over a period of several minutes cannot be the result of particle orientation, but must be ascribed to other causes, most likely heat effects.

With bodied vegetable oils, on the other hand, a definite larger change and a distinct time factor extending over a longer period of time have been observed in dielectric data, indicating a true thixotropy.

CONFERENCES HELD

SECTION OF BIOLOGY

CONFERENCE ON "ANTIHISTAMINE AGENTS IN ALLERGY": OCTOBER 3 AND 4, 1947

The Section of Biology held a Conference on "Antihistamine Agents in Allergy." Doctor Fredrick F. Yonkman, Ciba Pharmaceutical Products, Inc., Summit, N. J., was the Conference Chairman in charge of the meeting.

The program consisted of the following papers:

Friday, October 3

Morning Session. "Opening Address," by the Conference Chairman.

"The Pharmacology of Histamine," by Sir Henry H. Dale, formerly Director of the National Institute for Medical Research, Mount Vernon House, N.W.3, England.

"The Role of Histamine and Other Metabolites in Anaphylaxis," by Carl A. Dragstedt, Northwestern University Medical School, Chicago, Illinois.

"The Role Played by Leucocytes and Platelets in Anaphylactic and Peptone Shock," by M. Rocha e Silva, Instituto Biologico, Sao Paulo, Brazil.

Afternoon Session. Chairman, Robert A. Cooke, Roosevelt Hospital, New York, N. Y.

"The Immunologic Aspects of Anaphylaxis and Allergy," by M. W. Chase, Rockefeller Institute for Medical Research, New York, N. Y.

"The Detoxification of Histamine," by E. T. Waters, Banting and Best Department of Medical Research and Department of Physiology, University of Toronto, Toronto, Canada.

"Histamine-Azo Proteins in Anaphylaxis and Allergy," by Norbert Fell, Camp Detrick, Frederick, Maryland.

Saturday, October 4

Morning Session. Chairman, George Rieveschl, Jr., Parke, Davis and Company, Detroit, Michigan.

"Introduction of Antihistamine Agents and Antergan Derivatives," by Daniel Bovet, Instituto Superiore di Sanità, Rome, Italy.

"The Anti-Allergic Activity of Pyribenzamine and Related Compounds, with Special Reference to Their Mode of Action," by Rudolf L. Mayer, Ciba Pharmaceutical Products, Inc., Summit, N. J.

"Specificity of Antihistamine Drugs," by Earl R. Loew, Department of Pharmacology, University of Illinois College of Medicine, Chicago, Illinois.

Afternoon Session. Chairman, Sanford B. Hooker, Boston University, School of Medicine, Boston, Massachusetts.

"Pharmacological Studies of the Antihistaminic Thephorin, by G. Lehmann, Hoffmann-La Roche, Inc., Nutley, N. J.

"Antistine and Related Imidazolines," by Rolf Meier, Medical Director, Ciba Limited, and University of Basel, Basel, Switzerland.

"The Mode of Action of Antihistaminic Agents in the Skin," by Charles F. Code, John U. Keating, and Milo D. Leavitt, Mayo Foundation, Rochester, Minnesota.

"Antihistamine Therapy, Experimental and Clinical Correlation," by Samuel M. Feinberg, Northwestern University Medical School, Chicago, Illinois.

CONFERENCE ON "THE CHEMOTHERAPY OF FILARIASIS": OCTOBER 17 AND 18, 1947

The Section of Biology held a Conference on "The Chemotherapy of Filariasis." Doctor J. H. Williams, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y., was the Conference Chairman in charge of the meeting.

The program consisted of the following papers:

Friday, October 17

Morning Session. Chairman, Arnold D. Welch, Western Reserve University, School of Medicine, Cleveland, Ohio.

"Introductory Paper," by L. T. Coggeshall, University of Chicago, Medical School, Chicago, Illinois.

"General Experimental Methods Used for Studying Filaricides," by Redginal I. Hewitt, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

"Use of Aresenicals in Filariasis," by G. F. Otto, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Maryland.

"Use of Antimonials in Filariasis I. Anthiomaline," by R. W. Brown, School of Public Health of the Faculty of Medicine, Columbia University, New York, N. Y.

"Use of Antimonials in Filariasis II. Neostibosan and Some Other Compounds," by J. T. Culbertson, University of Arkansas School of Medicine, Little Rock, Arkansas.

"Tolerance of Antimony and Arsenic by Intensively Treated Patients," by H. M. Rose, College of Physicians and Surgeons, Columbia University, New York, N. Y.

Afternoon Session. Chairman, J. H. Williams.

"Use of Cyanine Dyes in Filariasis I. Chemistry of the Cyanine Dyes," by L. G. S. Brooker, Eastman Kodak Research Laboratories, Rochester, N. Y.

"Use of Cyanine Dyes in Filariasis II. Chemotherapeutic Activity in the Cotton Rat," by H. N. Wright, J. T. Litchfield, Jr., T. Brey, E. M. Cranston, A. C. Cuckler, and R. N. Bieter, University of Minnesota Medical School, Minneapolis, Minnesota.

"Use of Cyanine Dyes in Filariasis III. Effect of Cyanine Dyes on the Metabolism of *L. Carinii*," by Ernest Bueding, Western Reserve University, School of Medicine, Cleveland, Ohio.

"Use of Cyanine Dyes in Filariasis IV. Pharmacology," by L. Peters, Western Reserve University, School of Medicine, Cleveland, Ohio.

Saturday, October 18

Morning Session. Chairman, L. T. Coggeshall.

"Use of Piperazines in Filariasis I. Chemistry," by Samuel Kushner, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

"Use of Piperazines in Filariasis II. Parasitology," by Redginal I. Hewitt, D. E. White, S. Kushner, W. S. Wallace, H. W. Stewart, and Y. SubbaRow, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

"Use of Piperazines in Filariasis III," by B. K. Harned, Raymond W. Cunningham, Sybella Halliday, R. E. Vessey, N. N. Yuda, Mary C. Clark, and Y. SubbaRow, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

"Clinical Report on the Treatment of Filariasis I. Parasitology," by J. Oliver-Gonzalez, School of Tropical Medicine, San Juan, Puerto Rico.

"Clinical Report on the Treatment of Filariasis II. Clinical," by D. Santiago-Stevenson, School of Tropical Medicine, San Juan, Puerto Rico.

CONFERENCE ON "MEDICAL MYCOLOGY": OCTOBER 31 AND NOVEMBER 1, 1947

The Section of Biology held a Conference on "Medical Mycology." Doctor Frederick Reiss, New York University, Medical Colege, New York, N. Y., was the Conference Chairman in charge of the meeting.

The program consisted of the following papers:

Friday, October 31

Morning Session: *General Mycology*. Chairman, Carroll W. Dodge, Missouri Botanical Garden, St. Louis, Missouri.

"Introductory Paper," by the Conference Chairman.

"Mycological Research and the Progress of Medicine," by Carroll W. Dodge.

"Public Health Aspects of Fungus Infections," by S. B. Salvin, National Institute of Health, Bethesda, Maryland.

"Evaluation of Classification of Pathogenic Fungi," by Morris Moore, The Barnard Free Skin and Cancer Hospital, St. Louis, Missouri.

"Future Developments in Mycological Investigative Methods," by Norman F. Conant, Duke University, School of Medicine, Durham, North Carolina.

Afternoon Session: *Special Clinical Mycology*. Chairman, Arturo L. Carrión, School of Tropical Medicine, San Juan, Puerto Rico.

Exhibition and Demonstrations by E. Muskatblit, New York University, Medical College, New York, N. Y.

"Superficial Dermatomycoses Caused by Trichophytons, Microsporons and Epidermophytons," by Fred D. Weidmann, University of Pennsylvania, Philadelphia, Pa.

"Chromoblastomycosis," by Arturo L. Carrión.

"Histoplasmosis," by Amos Christie, Vanderbilt University, School of Medicine, Nashville, Tennessee.

"Cryptococcosis and Blastomycosis," by Rhoda W. Benham, College of Physicians and Surgeons, Columbia University, New York, N. Y.

Evening Session. Chairman, Norman F. Conant.

Exhibition and Demonstrations by E. Muskatblit.

"The Nutritional Requirements of the Faviform Trichophytons," by Lucille Georg, College of Physicians and Surgeons, Columbia University, New York, N. Y.

"New Insight Gained in General Pathology and Practical Medicine by the Study of Sporotrichosis," by H. Gougerot, Hôpital Saint-Louis, Paris, France.

Saturday, November 1

Morning Session: *Physiology, Immunology, and Epidemiology*. Chairman, William J. Robbins, The New York Botanical Garden, New York, N. Y.

"The Growth Requirements of the Dermatophytes," by William J. Robbins.

"Fungus Antigens and Their Importance as Sensitizers in the General Population," by Samuel M. Peck, The Mount Sinai Hospital, New York, N. Y.

"Practical Applications of Immunological Principles in the Diagnosis and Treatment of Fungus Infections," by Donald C. Martin, Duke University, School of Medicine, Durham, North Carolina.

"Histoplasmin Skin Test," by Alexander M. Iams, Minneapolis, Minnesota.

"Some Biochemical Implications from a Study of Growth of Pathogenic Fungi on Media Containing Single Amino Acids," by R. M. Archibald, The Johns Hopkins University, Baltimore, Maryland, and Frederick Reiss, New York University, Medical College, New York, N. Y.

"Discussion of the Recent Trends in the Therapy of Superficial Fungus Infections," opened by Marion B. Sulzberger, New York Post-Graduate Medical School, Columbia University, New York, N. Y.

NEW MEMBERS

A. Elected from May 15, 1947, to September 15, 1947

LIFE MEMBERSHIP

Sanders, Murray, M.D., Biology, Physics, Chemistry. Associate Professor of Bacteriology, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Saslow, Herbert Basil, M.D., Reproduction Physiology, Genetics. Teaching Assistant, University of Illinois, Urbana, Ill.

Wasserman, Louis Robert, M.D., Biophysics. Adjunct Physician for Physiological Hematology, Mt. Sinai Hospital, New York, N. Y.

SUSTAINING MEMBERSHIP

Gallenkamp, Charles Benton. Assistant Curator, Departments of Anthropology and Paleontology, American Museum of Natural History, New York, N. Y.

Geary, John R., Jr., M.D., Respiratory Physiology. Department of Physiology, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Henze, Carlo, M.D., Internal Medicine, Pharmacology. Medical Director, Pharmaceutical Division, Sandoz Chemical Works, Inc., New York, N. Y.

Insell, Benjamin B., D.D.S., Industrial Chemistry and Physics. New York, N. Y.

Levy, David M., M.D., Psychodynamics. Assistant Professor of Psychiatry, Columbia University, New York, N. Y.

Lyman, Richard Sherman, M.D. Professor of Neuropsychiatry, Chairman of Department, Duke Hospital, Durham, N. C.

Manginelli, Piero, M.D., Biology. Assistant in Medicine, Department of Histology, Hospital Das Clinicas, Sao Paulo, Brazil.

Marshak, Richard H., M.D., Gastro-Enterology, Radiology. Assistant Radiologist, Mt. Sinai Hospital, New York, N. Y.

Proskauer, Richard, B.S., Physics, Servo Controls, Gyroscopics. Project Engineer, Sperry Gyroscope Co., Great Neck, L. I., N. Y.

ACTIVE MEMBERSHIP

Abreu, Benedict E., Ph.D. Assistant Professor of Pharmacology, University of California Medical School, San Francisco, Calif.

Adler, Edward, Ph.D., Chemistry, Electrochemistry. Industrial Consultant, New York, N. Y.

Agren, Gunnar, M.D. Associate Professor of Medical Chemistry, University of Uppsala, Uppsala, Sweden.

Allen, Thomas H., Ph.D. Instructor, Department of Physiology, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Allman, David Bacharach, M.D., F.A.C.S., F.I.C.S. Senior Surgical Chief, Atlantic City Hospital; Surgical Chief, Betty Bacharach Home for Afflicted Children; Consulting Surgeon, Atlantic County Hospital for Diseases to the Chest; Surgeon, Atlantic County Hospital for Mental Diseases, Atlantic City, N. J.

Altschul, Frank Joseph, M.D., Medicine, Psychology. Director, Medical Service, Monmouth Memorial Hospital, Long Branch, N. J.

Applbaum, Karl, J.S.D., Psychology, Anthropology. Brooklyn, N. Y.

Aries, Robert S., D.Ch.E., Cellulose, Lignin, High Polymers. Research Associate, Polytechnic Institute, Brooklyn, N. Y.

Asper, Samuel Phillips, Jr., M.D., Internal Medicine, Endocrinology. Instructor in Medicine, Johns Hopkins Medical School, Baltimore, Md.

Bader, Mortimer Eugene, M.D., Physiology, Biochemistry. 1st Lieutenant, Medical Corps., U. S. A., Climatic Research Laboratory, Lawrence, Mass.

Bader, Richard Arthur, M.D., Medicine, Allied Sciences. 1st Lieutenant, Medical Corps., U. S. A., Climatic Research Laboratory, Lawrence, Mass.

Baehr, George, M.D., Internal Medicine. Chief of 1st Med. Service and Director of Clinical Research, Mt. Sinai Hospital; Clinical Prof. of Medicine, Columbia University, New York, N. Y.

Baez, Silvio, M.D., Physiology. Research Fellow, Cornell Medical College, New York, N. Y.

Bauman, William C., Ph.D. Research Chemist, Dow Chemical Company, Midland, Mich.

Baylor, Edward R., M.S., General Physiology. Teaching Assistant, Princeton University, Princeton, N. J.

Baylor, Martha Barnes, Ph.D., Biology. Senior National Research Council Fellow, Rockefeller Institute for Medical Research, Princeton, N. J.

Bear, Richard S., Ph.D., X-Ray Diffraction Studies of Tissues and Natural Polymers. Professor, Department of Biology, Massachusetts Institute of Technology, Cambridge, Mass.

Benesch, Reinhold, M.Sc., Chemical Pathology, Biochemistry, Nutrition. Instructor, Department of Biochemistry, School of Hygiene, Johns Hopkins University, Baltimore, Md.

Benjamin, James W., Ph.D. Professor of Anatomy. New York Medical College, New York, N. Y.

Berend, Gertrude, Ph.D. Literature Chemist, Hoffman-LaRoche, Inc., Nutley, N. J.

Berkman, James, M.D., Medicine. Fellow in Pathology, Montefiore Hospital, New York, N. Y.

Berman, Rose L., B.A. Biologist, Food Research Laboratories, Long Island City, L. I., N. Y.

Bernard, Jack, M.A. Psychologist, Klein Institute for Aptitude Testing, New York, N. Y.

Bernstein, Harry, Ph.D., Latin American Anthropology. Instructor, Department of History, Brooklyn College, Brooklyn, N. Y.

Bernstein, Jeane, M.S., Biology, Zoology. Laboratory Instructor, Brooklyn College, Brooklyn, N. Y.

Bevans, Margaret, M.D., Pathology, Experimental Arteriosclerosis. Experimental Pathologist,

Goldwater Memorial Hospital, Welfare Island; Assistant Professor of Pathology, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Black, Herman, B.A. Teaching Fellow, Department of Biology, Washington Square College, New York University, New York, N. Y.

Blake, Clara Oltmann, M.A. Instructor, Department of Biology, Brooklyn College, Brooklyn, N. Y.

Blondheim, Solomon Hillel, M.D., Liver Disease. Pathology Appointment, Montefiore Hospital, New York, N. Y.

Blum, Lester, M.D. Adjunct Surgeon, Mt. Sinai Hospital, New York, N. Y.

Blum, Lucille Hollander, M.A., Child Development. Assistant, Guidance Laboratory, Teachers College, Columbia University, New York, N. Y.

Boell, Edgar J., Ph.D., Developmental Physiology, Experimental Embryology. Prof. of Biology, Osborn Zoological Laboratory, Yale University, New Haven, Conn.

Borison, Herbert L., M.S. Graduate Student, Teaching Assistant in Department of Physiology, Columbia University, New York, N. Y.

Bornor, Donald Humphrey, B.S., Proteins, Amino Acids. Supervisor of Research and Development on Industrial and Pharmaceutical Products, Sheffield Farms Co., Inc., New York, N. Y.

Bowes, Anna De Planter, M.A. Chief, Division of Nutrition, Pennsylvania Department of Health; Lecturer on Nutrition, School of Education, University of Pennsylvania, Philadelphia, Pa.

Bradley, E. Morton, Ph.D. Associate Professor of Anatomy, Temple University School of Medicine, Philadelphia, Pa.

Braley, Alson E., M.D., Biology. Assistant Professor of Ophthalmology, Columbia University, New York, N. Y.

Brink, Norman G., Ph.D. Research Chemist, Merck and Co., Inc., Rahway, N. J.

Brogan, Edythe Rose, B.A. Bacteriologist, Burroughs Wellcome Research Laboratories, Tuckahoe, N. Y.

Bryant, Gordon Hodges, Ph.D., Biochemistry, Biology, Psychology. Chairman of the Board, Frozen Food Institute, Inc., New York, N. Y.

Buchwalter, Francis, Ph.D., Physical Chemistry, Biology. Chief, Division of Physical Organic Research, Applied Sugar Laboratories, Inc., Brooklyn, N. Y.

Buno, Washington, M.D. Professor and Head, Department of Histology and Embryology, School of Medicine, University of Montevideo, Montevideo, Uruguay.

Burg, Marion, Ph.D., Organic Chemistry. Research Associate in Chemistry, Massachusetts Institute of Technology, Cambridge, Mass.

Burnett, Lee, M.S., Clinical Investigation, Biochemistry. Research Chemist, Sloan-Kettering Institute, New York, N. Y.

Bychowski, Gustav, M.D., Psychoanalysis, Psychosomatic Medical and Brain Pathology. Director, Department of Mental and Social Adjustment, Institute for Crippled and Disabled, New York, N. Y.

Cazzullo, Carlo Lorenzo, M.D., Biology, Neurology, Neurophysiology, Psychiatry. First Assistant, Neurologic Institute of Milan, Milan, Italy; Visiting Investigator, Rockefeller Institute for Medical Research, New York, N. Y.

Chaikoff, I. L., M.D., Ph.D., Physiology, Biochemistry. Professor of Physiology, University of California, Berkeley, Calif.

Chamberlin, Earl Martin, Ph.D. Research Chemist, Merck & Co., Inc., Rahway, N. J.

Chernick, Sidney S., M.A., Physiology, Nutrition. Department of Physiology, University of California, Berkeley, Calif.

Cizek, Louis Joseph, M.D. Instructor, Department of Physiology, Coll. of Phys. & Surgs., Columbia University, New York, N. Y.

Clancy, Carl F., Ph.D., Virology, Bacteriology. Research Associate, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

Clark, Duncan W., M.D., Internal Medicine, Metabolism. Associate Dean, Long Island College of Medicine, Brooklyn, N. Y.

Cohen, Seymour Stanley, Ph.D. Assistant Professor of Physiological Chemistry, University of Pennsylvania, Philadelphia, Pa.

Contini, Renato, M.E., Anthropology, Psychology. Project Director, Research Division, New York University, New York, N. Y.

Converse, John Marquis, M.D. Surgeon in charge of Plastic Surgery, Department of Surgery, New York University Medical College, New York, N. Y.

Coriell, Lewis L., M.D., Ph.D., Virus Diseases, Bacteriology, Pediatrics. Instructor in Pediatrics, University of Pennsylvania Medical School, Philadelphia, Pa.

Crepea, Seymour Bernard, M.D. Research Fellow in Allergy, Roosevelt Hospital, New York, N. Y.

Daley, Mark J., M.D., Neurology. Yonkers, N. Y.

Daniel, Esther P., D.Sc., Cell Nutrition. Senior Biochemist, National Cancer Institute, Bethesda, Md.

Danowski, Thaddeus Stanley, M.D., Internal Medicine. Renziehausen Professor of Research Medicine, Pittsburgh School of Medicine, Pittsburgh, Pa.

Dattner, Bernhard, M.D., Neuropsychiatry. Assistant Clinical Professor of Neurology, Coll. of Phys. and Surgs., Columbia University; Associate Clinical Professor, New York University, New York, N. Y.

Deitch, Arline Douglas, M.A., Zoology, Embryology, Cytochemistry. Assistant, Department of Zoology, Columbia University, New York, N. Y.

Deitz, Victor R., Ph.D., Surface Chemistry, Adsorption and Adsorbents, Commercial Adsorbents. Physicist, Chemist, National Bureau of Standards, Washington, D. C.

Dorfman, Ralph I., Ph.D., Biochemistry, Endocrinology. Assistant Professor of Biochemistry, Western Reserve University School of Medicine, Cleveland, Ohio.

Dumm, Mary Elizabeth, Ph.D., Biochemistry. Instructor in Chemistry, New York University College of Medicine, New York, N. Y.

Dunnington, John Hughes, M.D. Professor of Ophthalmology, Coll. of Phys. & Surgs., Columbia University, New York, N. Y.

Durlacher, Stanley H., M.D. Chief, Section of Experimental Pathology, Medical Division, Army Chemical Center, Edgewood, Md.

Dy, Francisco J., M.D., Malariology, Parasitology, Consultant, Chief of the Malaria Section, U. S. Public Health Service, Rizal, Philippines.

Edelman, Isidore S., M.D., Medicine, Biology, Chemistry, Physics. Senior Resident, Neoplastic Division, Montefiore Hospital, New York, N. Y.

Edman, Pehr Victor, M.D. Docent in Biochemistry, Karolinska Institutet, Stockholm, Sweden.

Edson, John Newell, M.D., Internal Medicine. Instructor, Department of Medicine, L. I. Coll. of Medicine; Assistant Attending Physician, L. I. Coll. Hospital, Brooklyn, N. Y.

Edwards, George A., M.S., Comparative Physiology. Assistant Professor in Biology, Tufts College, Boston, Mass.

Eisen, Herman Nathaniel, M.D., Hypersensitivity, Immunochemistry. Resident in Medicine, 3rd (N. Y. U.) Medical Division, Bellevue Hospital, New York, N. Y.

Eisenberg, Leon, M.D., Medicine, Physiology, Psychiatry. Instructor in Physiology, University of Pennsylvania, Philadelphia, Pa.

Elek, Adalbert, Ph.D., Microchemistry. Director, Microanalytical Labs., Los Angeles, Calif.

Engel, Lewis L., Ph.D., Biological Chemistry, Steroid Hormones. Research Associate, Biological Chemistry and Medicine, Harvard Medical School, Boston, Mass.

Engelhardt, Edward L., Ph.D. Research Chemist, Sharp & Dohme, Inc., Glenolden, Pa.

Epstein, Morton B., Ph.D., Constitution of Petroleum, Physical and Thermodynamic Properties of Hydrocarbons. Research Associate, American Petroleum Institute, National Bureau of Standards, Washington, D. C.

Estren, Solomon, M.D. Research and Clinic Assistant in Hematology, Mt. Sinai Hospital, New York, N. Y.

Farber, Saul J., M.D., Kidney Physiology. Assistant Resident, 3rd Medical Division, Bellevue Hospital, New York, N. Y.

Feder, Diana, B.A., Endocrinology. Teaching Fellow in Biology, Washington Square College, New York University, New York, N. Y.

Federn, Paul, M.D., Psychoanalysis, Psychiatry. New York Psychoanalytic Institute, New York, N. Y.

Feigin, William M., B.A. Teaching Fellow in Biology, Washington Square College, New York University, New York, N. Y.

Festinger, Leon, Ph.D., Social Psychology. Assistant Professor of Psychology, Massachusetts Institute of Technology, Cambridge, Mass.

Fischer, Ernst, M.D., Physiology. Professor of Physiology, Baruch Center of Physical Medicine, Medical College of Virginia, Richmond, Va.

Foldes, Eugene, M.D., Internal Medicine. Lecturer, N. Y. Polyclinic Medical School and Hospital, New York, N. Y.

Fontaine, Thomas Davis, Ph.D. Chemist, Biologically Active Compounds Division, Agricultural Research Center, Beltsville, Md.

Freeman, Benjamin, Ph.D. Chemist, Advance Chemical Products Co., Brooklyn, N. Y.

Freiman, Henry D., M.D., Medicine. Graduate Student, School of Medicine, University of Pennsylvania, Philadelphia, Pa.

Friedman, Lester David, M.D., Internal Medicine, Anthropology. Assistant Attending Physician, Montefiore Hospital, New York, N. Y.

Friedemann, Max W., M.D., Psychiatry, Psychology, Anthropology, Biology. Senior Psychiatrist, Pinewood Sanatorium, Crotona, N. Y.

Gey, George O., M.D., Cancer Research. Instructor in Surgery; Assistant Director, Division for Cell Physiology, Department of Surgery, Johns Hopkins Medical School, Baltimore, Md.

Glaubiger, Albert, M.S., Biochemistry. Chemist, Department of Health, New York, N. Y.

Glusman, Murray, M.D., Muscle Chemistry, Nutritional Deficiency. Assistant Resident in Neurology, Neurological Institute, New York, N. Y.

Goetzl, Franz R., M.D., Ph.D. Director, Department of Medical Research, Permanente Foundation, Oakland, Calif.

Goldberg, Samuel A., M.D., Ph.D., D.V.M., Pathology. Director of Laboratories, Presbyterian Hospital, Newark, N. J.

Golden, Abner, M.D., Cardiovascular Renal Research. 1st Asst. Resident in Medicine, Grady Memorial Hospital, Atlanta, Ga.

Goodhart, Robert Stanley, M.D., Biochemistry, Nutrition. Scientific Director, National Vitamin Foundation; Member, Food and Nutrition Board, National Research Council, New York, N. Y.

Goreau, Thomas, M.Sc., Biology, Physiology of Sea Animals. Research Assistant, Osborn Biological Laboratory, Yale University, New Haven, Conn.

Gould, Bernard, Ph.D., Enzymology, Biochemistry of Micro-organisms. Associate Professor of Biochemistry, Massachusetts Institute of Technology, Cambridge, Mass.

Green, Elizabeth Ufford, Ph.D., Cytology, Cancer. Biologist, Landeman Hospital Research Institute, Philadelphia, Pa.

Green, John D., B.Ch., Biology. Blain Fellow, Wayne University Medical School, Detroit, Michigan.

Gregory, John Delafield, Ph.D., Organic Chemistry, Biochemistry. Research Associate, Rockefeller Institute for Medical Research, New York, N. Y.

Griffith, Wendell H., Ph.D. Professor of Biological Chemistry, St. Louis University School of Medicine, St. Louis, Mo.

Grolnick, Max, M.D., Allergy; Contact Allergy

(Skin). Associate-attending in Allergy, Jewish Hospital; Coney Island Hospital, Brooklyn, N. Y.

Guiteras, Albert F., Ph.D., Chemistry, Bacteriology. Research Co-ordinator, Foster D. Snell, Inc., New York, N. Y.

Gumbel, Emil J., Ph.D., Mathematical Statistics. Associate Professor, Brooklyn College, Brooklyn, N. Y.

Hampil, Bettylee, Sc.D. Director of Virus Research, Medical Research Division, Sharp & Dohme, Inc., Glenolden, Pa.

Handley, Carroll A., Ph.D. Associate Professor of Physiology and Pharmacology, Baylor University College of Medicine, Houston, Texas.

Harris, A. Sidney, Ph.D., Physiology, Heart and Nervous System. Associate Professor of Physiology, Baylor University College of Medicine, Houston, Texas.

Harris, Paul N., M.D. Pathologist, Eli Lilly & Co., Indianapolis, Ind.

Hasson, Jack, B.S. Medical Student, City College of the City of New York, New York, N. Y.

Heinemann, Heinz, Ph.D., Chemistry, Catalysis, Adsorption. Research Supervisor, Attapulgus Clay Co., Camden, N. J.

Heller, George, Ph.D., Bacteriology. Associate Director, Biological Labs., Inc., New York, N. Y.

Henle, Mary, Ph.D. Assistant Professor of Psychology, Graduate Faculty of Political and Social Science, New School for Social Research, New York, N. Y.

Hidnert, Peter, Ph.D., Physics. Chief, Thermal Expansion Section, National Bureau of Standards, Washington, D. C.

Hinds, Ewart Gladstone, M.D., Ph.D., Psychiatry, Childhood Schizophrenia. Research Fellow, Psychiatry, New York University, New York, N. Y.

Householder, Alston S., Ph.D., Mathematical Biology, Psychology. Principal Physiscist, Clinton Labs., Oak Ridge, Tenn.

Huff, Jesse William, Ph.D., Metabolism of Nicotinic Acid. Research Biochemist, Sharp & Dohme, Inc., Glenolden, Pa.

Hummel, Katharine P., Ph.D., Histology, Embryology, Cancer Research. Research Associate, R. B. Jackson Lab., Bar Harbor, Maine.

James, Vera L., M.S., Biology. Dept. of Pharmacology, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Johnson, Julius E., Ph.D. Head, Chemotherapy Group, Biochemical Research Lab., Dow Chemical Co., Midland, Mich.

Jordan, William K., M.D., Cell Physiology. Research Assistant, Department of Biology, Princeton University, Princeton, N. J.

Karon, Melvin L., M.S., Chemical and Biochemical Research. Research Chemist, Southern Regional Research Lab., New Orleans, La.

Kaufman, Jerome G., M.D. Assistant Professor of Medicine, N. Y. Medical College, New York, N. Y.

Kaufmann, Oliver W., M.S., Bacteriologoy, Antibiotics. Research Bacteriologist, Sheffield Farms, New York, N. Y.

Kaunitz, Paul Ehrlich, M.D., Biophysics. Fellow in Medicine, Mt. Sinai Hospital, New York, N. Y.

Kemp, Carol Louise, B.A., Biochemistry. Research Assistant, Thorndike Lab., Boston City Hospital, Boston, Mass.

Keston, Albert S., Ph.D., Biochemistry. Assistant Professor, New York University Medical School, New York, N. Y.

King, George J., B.A., Colloid Chemistry, Organic Surface Active Agents. Manager, Technical Service, Atlas Powder Co., New York, N. Y.

Klein, Samuel Harold, M.D. Associate Attending Surgeon, Mt. Sinai Hospital, New York, N. Y.

Koepf, George F., M.D., Endocrinology. Associate in Physiology; Instructor in Medicine, University of Buffalo, Buffalo, N. Y.

Korey, Saul Roy, M.D., Medicine, Biology, Chemistry. Resident Neurologist, Medical Center, Neurological Institute of N. Y., New York, N. Y.

Kowal, Samuel J., M.D., Ph.D., Internal and Psychosomatic Medicine. Instructor, Boston University School of Medicine, Boston, Mass.

Krakauer, Joseph S., M.D., Medicine, Biology, Chemistry. Assistant Resident, Division of Neoplastic Diseases, Montefiore Hospital, New York, N. Y.

Kurtz, Russell Belden. Chemist, Hunter College, New York, N. Y.

Lanza, Anthony J., M.D., Industrial Medicine and Hygiene. Associate Medical Director, Metropolitan Life Insurance Co.; Professor of Industrial Medicine, N. Y. U. Medical School; Director, Institute for Industrial and Social Medicine, N. Y. U. Medical Center, New York, N. Y.

Larach, Simon, B.S., Chemico-physics of Luminescence in Solids. Research Chemist, R. C. A. Labs., Princeton, N. J.

Lawler, John A., Jr., M.D., Basic Sciences as Related to Medicine. Attending Surgeon, Bellevue Hospital; St. Vincent's Hospital; Assistant Professor of Clinical Surgery, New York University, New York, N. Y.

Lebish, Jacob, D.V.S., Biology, Anthropology. New York, N. Y.

Lehv, S. P., M.D., Neoplasms. Assistant Surgeon, Surgical Staff, Harlem Hospital, New York, N. Y.

Lemon, Julia G., M.S., Biochemistry. Research Associate, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

LeVeen, Harry Henry, M.D., Surgery, Physiology, Biochemistry. Instructor, Department of Surgery, New York University College of Medicine, New York, N. Y.

Lewis, Lena A., Ph.D., Medical Research, Adrenal Field, and Electrophoresis as Applied to Medical Problems. Staff Member, Research Division, Cleveland Clinic Foundation, Cleveland, Ohio.

Lewisohn, Richard, M.D., Cancer Research. Consulting Surgeon, Mt. Sinai Hospital, New York, N. Y.

Linder, Jerome M., M.D., Vasomotor Physiology. Clinical Surgeon, Kings County Hospital, Brooklyn, N. Y.

Lipetz, Leo E., B.E.E. Biophysics Research Assistant, University of California, Los Angeles, Calif.

Lipsett, Mortimer B., M.S., Biochemistry. Medical Student, University of Southern California, Los Angeles, Calif.

Littauer, Sebastian B., Sc.D. Professor of Mathematics and Chairman of Department, Newark College of Engineering, Newark, N. J.

Lobotsky, Julia, M.S., Endocrinology. Research Assistant, Department of Physiological Chemistry, College of Medicine, Syracuse University, Syracuse, N. Y.

Locks, Matthew Owen, M.D., Internal Medicine. Westport, Conn.

London, Sol, M.D. Staff Physician, Halloran V. A. Hospital, Staten Island, N. Y.

Low, Eva M., Ph.D., Organic Chemistry. Research Assistant, Department of Zoology, Yale University, New Haven, Conn.

Lowe, Adolph, Dr. Juris, Social Science. Director of Research, Institute of World Affairs; Professor of Economics, Graduate Faculty of Political and Social Science, New School for Social Research, New York, N. Y.

Lynd, Helen Merrell. Ph.D., Social Philosophy. Senior Member, Social Science Department, Sarah Lawrence College, Bronxville, N. Y.

MacCardle, Ross C., Ph.D. Senior Cytologist, National Cancer Institute, Bethesda, Md.

McCarty, Kenneth Scott, B.S. Cancer Research, Hyde Foundation, New York, N. Y.

McShan, William H., Ph.D., Endocrinology, Enzymology. Associate Professor of Zoochemistry, University of Wisconsin, Madison, Wis.

Maillard, Edgar R., M.D., Public Health, Medicine. Associate Pathologist, Charge of Branch Lab., N. Y. State Department of Health, New York, N. Y.

Mandel, Charles, M.D., Physiology, Biochemistry. New York, N. Y.

Maray, Hugh Z., M.D., General Surgery, Vascular Diseases. Instructor in Surgery, New York University College of Medicine, New York, N. Y.

Marks, Paul Alan, B.A. Medical Student, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Marple, Charles Dalliba, M.D., Internal Medicine, Cardiovascular Diseases. Fellow, Vascular Disease Research, Cornell University Medical College; The New York Hospital, New York, N. Y.

Maver, Mary E., Ph.D., Biochemistry of Cancer, Proteolytic Enzymes. Senior Biochemist, National Cancer Institute, Bethesda, Md.

Maxwell, Morton Harrison, M.D., D.N.B., Medicine. Assistant Resident, Neurological Institute of N. Y., New York, N. Y.

Mayer, Gerda Gernsheim, Ph.D., Biochemistry. Research Associate in Chemistry, Mt. Sinai Hospital, New York, N. Y.

Mellquist, Enid H., B.A., Biochemistry. Technician, Rockefeller Institute for Medical Research, New York, N. Y.

Melnitsky, Ida, B.A., Biochemistry, Physiology. Teaching Fellowship in Biology, New York University, New York, N. Y.

Mendlowitz, Milton, M.D., Biology. Adjunct Physician, Mt. Sinai Hospital, New York, N. Y.

Messinger, William Josef, M.D. Associate in Research, New York University School of Medicine, New York, N. Y.

Michel, John, Aviation, Rocketry, Electronics, Archaeology. Associate Editor, Air Trails, Flying Aces; Editor-in-Chief, Flying Age Traveler, New York, N. Y.

Miller, James A., Ph.D., Biochemical Aspects of Cancer. Assistant Professor of Cancer Research, McArdle Memorial Lab., University of Wisconsin, Madison, Wis.

Minor, Allen H., M.D., Cancer Research, Metabolic Aspects. Trainee, National Cancer Institute, Memorial Hospital, New York, N. Y.

Mirone, Leonora, M.S., Nutrition. Student, Department of Biochemistry, Fordham University, Bronx, N. Y.

Morgareidge, Kenneth, Ph.D., Biochemistry, Nutrition, Vitamins. Director, Research and Control Labs., Nopco Chemical Co., Harrison, N. J.

Moses, Montrose J., M.A., Zoology (Cytology). Asst., Department of Zoology, Columbia University, New York, N. Y.

Munro, Muriel Platt, Ph.D., Blood Coagulation, Protein Chemistry. Research Chemist, Charlotte Drake Cardeza Foundation; Dept. of Medicine, Jefferson Medical Hospital, Philadelphia, Pa.

Murphy, Wallace B., M.D., D.Sc., Surgery, Peripheral Vascular Disease. Assistant Professor of Clinical Surgery, New York University; Associate Visiting Surgeon, Bellevue Hospital, New York, N. Y.

Myers, Gordon B., M.D. Professor of Medicine, Wayne University College of Medicine, Detroit, Mich.

Nelson, Carl Truman, M.D., Bacteriology, Immunology, Clinical Medicine. Instructor in Dermatology, Columbia University, New York, N. Y.

Nicholas, John Spangler, Ph.D., Embryology. Sterling Professor of Biology; Chairman, Department of Zoology, Osborn Zoological Lab., Yale University, New Haven, Conn.

Nielsen, Edward, Ph.D., Biochemistry. Biochemist, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

Nigg, Clara, Ph.D., Bacteriology, Virology. Head, Virus Labs., E. R. Squibb & Sons, New Brunswick, N. J.

Nixon, Norman, M.D., Psychiatry. Member, Attending Staff; Council, Child Development Center, New York, N. Y.

O'Kane, Daniel J., Jr., M.S., Bacteriology. Fellow, Lab. of Bacteriology, Cornell University, Ithaca, N. Y.

Oroshnik, William, Ph.D., Organic Syntheses, Medicinal Chemistry. Director, Division of

Organic Chemistry, Ortho Research Foundation, Raritan, N. J.

Owen, Philip S., M.D., Medical Research; Growth, Neoplasia. Executive Secretary, Committee on Growth, National Research Council, Washington, D. C.

Page, Irvine H., M.D., Cardiovascular-renal Disease. Director of Research, Cleveland Clinic, Cleveland, Ohio.

Parker, Julius G., M.D., Internal Medicine. Assistant Resident in Pathology, Montefiore Hospital, New York, N. Y.

Parker, Robert F., M.D., Medicine, Microbiology. Associate Professor of Medicine, Western Reserve University, Cleveland, Ohio.

Perera, George A., M.D., Med.Sc.D. Assistant Professor of Medicine, Coll. of Phys. and Surgs., Columbia University; Assistant Attending Physician, Presbyterian Hospital; Vanderbilt Clinic, New York, N. Y.

Perr, Herbert M., M.D., Internal Medicine. Assistant Resident in Chest Diseases, Montefiore Hospital, New York, N. Y.

Peyser, Pincus, B.A., Biochemistry. Research Assistant, Division of Experimental Medicine, University of Vermont School of Medicine, Burlington, Vt.

Pines, Kermit L., M.D., Medicine, Hypertension, Nicotinamide Metabolism. Student, Department of Medicine, Coll of Phys. and Surgs., Columbia University, New York, N. Y.

Pollack, Abou D., M.D., Medicine, Biology. Pathologist, Camp Detrick, Frederick, Md.

Popino, Robert P., B.S., Antibiotics, Chemotherapeutics. Supervising Chemist, Heyden Chemical Corp., New York, N. Y.

Potor, Aurelio, M.D., Internal Medicine, Clinical Investigation. Fellow in Medicine, Sloan-Kettering Institute, New York, N. Y.

Potter, Van R., Ph.D., Enzymology, Intracellular Physiology, Cancer Research. Associate Professor in Cancer Research, McArdle Memorial Lab., University of Wisconsin, Madison, Wis.

Powers, William Thomas, Ph.D., Zoology, Endocrinology, Experimental Embryology. Chairman, Department of Biology, De Paul University, Chicago, Ill.

Prytz, Bo., Ph.D., Biochemistry. Chief Pharmaceutical Chemist, Carnegie Inst. of Washington, Cold Spring Harbor, L. I., N. Y.

Puharich, Henry Karl, M.D. Research Associate, Department of Medical Research, Permanente Foundation, Oakland, Calif.

Ramsey, Robert Weberg, Ph.D., Physiology, Muscle Research. Associate Professor; Acting Chairman, Department of Physiology, Medical College of Virginia, Richmond, Va.

Redish, Milton H., M.D., Internal Medicine. Section Chief, Department of Medicine, Halloran V. A. Hospital, Staten Island, N. Y.

Rhian, Morris, M.Sc. Biophysicist, Michigan Department of Health, Lansing, Mich.

Richter, Maurice N., M.D. Director, Department of Pathology and Bacteriology, N. Y. Post-Graduate Medical School and Hospital, Columbia University, New York, N. Y.

Riehl, Herbert, M.S., Meteorology, Climatology, Oceanography. Assistant Professor of Meteorology, University of Chicago, Chicago, Ill.

Rittenberg, David, Ph.D. Associate Professor, Department of Biochemistry, Columbia University, New York, N. Y.

Robb, Jane Sands, M.D., Sc.D., Cardiac Physiology, Biology. Cardiac Research, Syracuse University College of Medicine, Syracuse, N. Y.

Rohrmann, Ewald, Ph.D., Organic and Medicinal Chemistry. Director, Division of Organic Chemistry, Eli Lilly & Co., Indianapolis, Ind.

Rolph, W. Donald, Jr., M.D., Medicine, Biology. Assistant Resident, Roosevelt Hospital, New York, N. Y.

Rosen, Samuel H., M.D. Associate Pathologist, Montefiore Hospital, New York, N. Y.

Rosenthal, Norman, M.D., Medicine. Resident in Medicine, Brooklyn Jewish Hospital, Brooklyn, N. Y.

Rosenthal, Otto, M.D., Biochemistry, Cancer Research. Associate in Cancer Research, Harrison Department of Surgical Research and Department of Physical Chemistry, Hospital of the University of Pennsylvania, Philadelphia, Pa.

Rothe, Ernest E., M.D., Biology, Medicine, Psychology, Astronomy. Research Fellow, Medical Teacher, Mt. Sinai Hospital, New York, N. Y.

Rubin, Saul H., Ph.D. Director, Nutrition Labs., Hoffmann-La Roche, Inc., Nutley, N. J.

Rusoff, Irving, Ph.D. Head of Nutritional Research, Fleischmann Labs., New York, N. Y.

Russ, Clem, M.S., Genetics. Assistant Professor of Biology, University of Pittsburgh, Pittsburgh, Pa.

Schaffner, Bertram H., M.D., Neuropsychiatry, Social Psychiatry. Resident, N. Y. State Psychiatric Institute, New York, N. Y.

Schmitt, Otto H., Ph.D., Biophysics. Associate Professor of Zoology and Physics, University of Minnesota, Minneapolis, Minn.

Schreiner, George E., M.D. Assistant in Physiology, New York University College of Medicine, New York, N. Y.

Seegal, David, M.D., Research, Clinical Investigation — Biology of Hemolytic Streptococcus Infections; Mechanism of Glomerulonephritis. Director, Research Service, Goldwater Memorial Hospital, Welfare Island, New York, N. Y.

Shapiro, Daniel M. Captain, M. C., Cancer Research, Medical Division, Edgewood Arsenal, Md.

Shen, Shih-Chang, Ph.D., Physiology. Deputy Director, China Institute of Physiology and Psychology, Shanghai, China.

Sherman, Hyman, M.D., Allergy, Immunology. Associate Attending Physician, Jewish Hospital of Brooklyn; Coney Island Hospital, Brooklyn, N. Y.

Siffert, Robert S., M.D. Resident in Orthopedic Surgery, Mt. Sinai Hospital, New York, N. Y.

Simon, Philip N., Ph.D., Food Chemistry, Bacteriology. Lab. Director, Hanscom Baking Corp., Long Island City, N. Y.

Smith, Douglas Edwin, Ph.D., Physiology. Senior Instructor, St. Louis University School of Medicine, St. Louis, Mo.

Smith, James J., M.D., Internal Medicine, Metabolic, Endocrine Research. Instructor in Medicine, New York University Medical School, New York, N. Y.

Solomon, Ann, B.A. Technician, Chemistry Lab., Montefiore Hospital, New York, N. Y.

Solowey, Mathilde, Ph.D. Bacteriologist, Microbiology Research Division, Bureau of Agric. and Indust. Chem., U. S. Dept. of Agriculture, Philadelphia, Pa.

Spiro, David, M.D., Medicine, Pathology. Assistant Resident, Pathology, Montefiore Hospital, New York, N. Y.

Stamberger, Paul, D.Sc., Chemistry. Director of Research, Stamford Rubber Supply Co., Stamford, Conn.

Steblay, Raymond William, B.A., Theoretical Physical Chemistry. Research Associate, Evolution, Princeton University, Princeton, N. J.

Stevens, Eugene, M.D., Cardiology. Assistant Adjunct and Visiting Physician, Beth David Hospital; Gouverneur Hospital, New York, N. Y.

Stewart, James, B.S., Physics, Chemistry, Biology. Electrical Engineer, American Telephone & Telegraph Co., Brooklyn, N. Y.

Sullivan, William R., Ph.D. Research Chemist, Hoffmann-LaRoche, Inc., Nutley, N. J.

Summers, William A., Ph.D. Assistant Professor, Department of Bacteriology and Parasitology, Medical College of Virginia, Richmond, Va.

Sweet, Leon A., Ph.D., Medicinal and Pharmaceutical Products, Organic and Biochemistry. Director of Chemical Research and Products Development, Parke, Davis & Co., Detroit, Mich.

Tabor, S. Lewis, M.A. Psychology Instructor, Abbe Thestre School, New York, N. Y.

Tauber, Henry, Ph.D. Biochemist, V. D. Research Lab., U. S. Marine Hospital, Staten Island, N. Y.

Thomas, Thurlo B., Ph.D., Zoology, Histology, Cytology. Professor of Zoology; Chairman of Zoological Sciences, Carleton College, Northfield, Minn.

Thompson, Randall D., Bacteriology, Auxiliary Fields. Professor of Microbiology, Indiana University Medical Center, Indianapolis, Ind.

Troll, Walter, M.S., Biological Chemistry. Research Fellow, New York University, New York, N. Y.

Twombly, Gray H., M.D., Carcinoma of the Female Genitalia. Assistant Surgeon, Memorial Hospital; Assistant Professor of Cancer Research, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Varney, Roger F., Ph.D., Endocrinology, Biochemistry, Bioassay. Head, Biological Assay Department, E. R. Squibb & Sons, New Brunswick, N. J.

Vastola, Edward, M.D., Medicine, Biology, Chemistry, Meteorology. Interne, Montefiore Hospital, New York, N. Y.

Vibar, Jose S., M.S., Physics, Chemistry, Geology. Chemist, San Pablo Oil Factory, San Pablo City, Philippines.

Wang, Shih-Chun, Ph.D., M.D., Physiology. Assistant Professor, Department of Physiology, Columbia University, New York, N. Y.

Warner, Robert C., Ph.D., Chemistry of Proteins. Assistant Professor of Chemistry, New York University College of Medicine, New York, N. Y.

Warshall, Hyman Beril, Medicine, Pediatrics. Visiting Physician, Kingston Ave. Hospital; Assistant Pediatrician, Jewish Hospital; L. I. College Medical School, Brooklyn, N. Y.

Waterman, Robert E., B.S., Chemistry, Biochemistry. Vice President, Schering Corp., Bloomfield, N. J.

Weiner, H. A., M.D., Medicine. Assistant Chief of Medicine, Halloran V. A. Hospital, Staten Island, N. Y.

Weis, Marcia, M.S. Teaching Fellow, Department of Biology, N. Y. University, New York, N. Y.

Weiss, Charles M., B.S., Marine Sedentary Organisms, Marine Bacteriology, Sanitary Biology. Research Assistant in Biology, Woods Hole Oceanographic Institution, Woods Hole, Mass.

Wentworth, Walter Allerton, B.S. Director, Industrial Relations, Borden Co., New York, N. Y.

Weston, Jean Kendrick, M.D., Ph.D. Professor of Anatomy, Temple University School of Medicine, Philadelphia, Pa.

Wiese, Catherine Elisabeth, B.A., Chemistry, Biology. Research Fellow, University of Southern California, Los Angeles, Calif.

Williams, James Horace, Ph.D., Chemistry, Medical Sciences. Administrative Director of Research, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

Wilson, David Wright, Ph.D. Benjamin Rush Professor of Physiological Chemistry, University of Pennsylvania, Philadelphia, Pa.

Winternitz, William W., M.D., Internal Medicine. 1st Lt., M.C., Edgewood Arsenal, Md.

Wolf, Milton, M.S., Organic Chemistry. Student, Fordham University, Bronx, N. Y.

Wolfenstein, Martha, Ph.D. Staff Psychologist, Walden School, New York, N. Y.

Wolffe, Joseph B., M.D., Internal Medicine, Cardiovascular Diseases, Arteriosclerosis. Medical Director, Wolffe Clinic; Associate Professor in Medicine, Temple University School of Medicine, Philadelphia, Pa.

Wolk, Bernard, M.A., Physical Chemistry. Chemist, Sylvania Electrical Products, Inc., Kew Gardens, L. I., N. Y.

Wright, Louis Tompkins, M.D., D.Sc., F.A.C.S., Physics, Chemistry. Director of Surgery, Harlem Hospital, New York, N. Y.

Wright, Myron, M.D. Assistant Attending Physician, Out Patient Department, St. Luke's Hospital, New York, N. Y.

Zeissig, Alexander, D.V.M., Ph.D., Infectious Diseases of Animals. Veterinary Consultant, N. Y. State Dept. of Health, Albany, N. Y.

Ziff, Morris, Ph.D., Clinical Biochemistry. Lecturer in Chemistry, New York University, New York, N. Y.

Zimmerman, H. M., M.D., Pathology, Cancer Research. Chief, Lab. Division, Montefiore Hospital, New York, N. Y.

Zuckerman, Leo, B.A., Biochemistry. Chemist, Protein Fractionation Department, E. R. Squibb & Sons, Inc., New Brunswick, N. J.

STUDENT MEMBERSHIP

Aronowitz, Olga, B.A., Genetics. Teaching Fellow, Biology, New York University, New York, N. Y.

Burke, Gloria, Biology. Student, College of New Rochelle, New Rochelle, N. Y.

Feltzin, Joseph, B.A. Chemist, Squibb Institute for Medical Research, New Brunswick, N. J.; Student, Brooklyn College, Brooklyn, N. Y.

Malsman, Marcia, B.A. Student, Department of Physiological Chemistry, Yale University, New Haven, Conn.

Marcus, Theodor Ricardo, B.S., Genetics. Teaching Fellow, Department of Biology, New York University, New York, N. Y.

Parker, Charles Osgood, B.A., Organic Chemistry. Student, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Plummer, Jewel Isadora, M.S., Cell Physiology. Teaching Fellow, Department of Biology, New York University, New York, N. Y.

Policastro, Susanna, B.S., Psychology, Education. Student; Teacher, Secondary, School, New York, N. Y.

Rakos, Ada Ruth, B.A., Genetics. Student, New York University, New York, N. Y.

Schryver, Judy, B.A., Physical Chemistry of Polymers. Student, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Sheppard, Erwin, B.S., Biophysics, Photochemistry of Proteins. Student, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Stone, Robert S., B.A., Anatomy. Student, Long Island College of Medicine, Long Island City, N. Y.

Zillessen, Paul Ehrlich, Biology. Student, Blair Academy, Blairstown, N. J.

B. Elected October 23, 1947

LIFE MEMBERSHIP

Shaw, Gail L., M.S., Organic Chemical Research and Development. Department Head, Organic Chemical Division, Eli Lilly & Co., Indianapolis, Ind.

SUSTAINING MEMBERSHIP

Chobot, Robert, M.D. Director of Children's Allergy Clinic, N. Y. Post-Graduate Hospital; Asst. Chief, Allergy Clinic, Roosevelt Hospital, New York, N. Y.

Julian, Percy L., D.Sc., Ph.D., Organic Chemistry, Biochemistry. Director of Research and Manager of Fine Chemicals, Soya Products Division, Glidden Co., Chicago, Ill.

Sheckman, Edward, M.D., Medicine, Cardiovascular Disease. Asst. Resident, Research Assistant, Goldwater Memorial Hospital, Welfare Island, New York, N. Y.

ACTIVE MEMBERSHIP

Adams, Elijah, M.D., Internal Medicine, Hematology, Metabolism. Research Fellow, Physiological Chemistry, Yale University, New Haven, Conn.

Arbesman, Carl, M.D., Medicine, Allergy. Instructor in Immunology, University of Buffalo, Buffalo, N. Y.

Austrian, Robert, M.D., Bacteriology, Internal Medicine. Research Associate, Department of Bacteriology, New York University College of Medicine, New York, N. Y.

Baer, Louis H., L.L.B., Pharmaceutical Chemistry. New York, N. Y.

Balch, Henry Hezekiah, M.D., Bacteriology, Surgery. Instructor in Surgery, New York University, College of Medicine, New York, N. Y.

Barton, Eleanor Phillips, Ph.D., Zoology, Histology. Assistant Professor of Zoology, New Jersey College for Women, Rutgers University, New Brunswick, N. J.

Batchelor, William Henry, M.D., Internal Medicine. Resident in Research, Goldwater Memorial Hospital, Welfare Island, New York, N. Y.

Bauer, Edward C., Biology, Chemistry, Physics, Psychology. Assistant, Department of Zoology, University of Connecticut, Storrs, Conn.

Bickerman, Hylan A., M.D., Biology. Research Fellow, Asst. in Medicine, Columbia University, New York, N. Y.

Blackman, Bernice R., B.A. Medical Student, New York Medical College, New York, N. Y.

Blute, James Francis, Jr., M.D. Resident in Internal Medicine, Boston City Hospital, Boston, Mass.

Bolomey, Alfred A., M.D., Cardiovascular, Renal Physiology. Instructor in Physiology, Fellow in Medicine, New York University College of Medicine, New York, N. Y.

Buck, John B., Ph.D. Senior Cytologist, Laboratory of Physical Biology, National Institute of Health, Bethesda, Md.

Cahen, Raymond L., M.D., Ph.D. Chief Pharmacologist, Maltbie Chemical Co., Morristown, N. J.

Cohen, Raphael, Medicine, Neurology, Neuropsychiatry. Medical Student, New York, N. Y.

Cohen, Victor L., M.D., Allergy. Instructor, University of Buffalo, Buffalo, N. Y.

Conan, Neal J., Jr., M.D., Hepatic and Renal Physiology. Research Fellow, New York University College of Medicine, New York, N. Y.

Coniglio, Louise, B.A., Bacteriology. Instructor in Biology, St. John's University, Brooklyn, N. Y.

Coret, Irving Allen, M.D. Asst. and Fellow, Department of Pharmacology, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Dansby, Doris, B.A. Research Associate in Mycology, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

Dethier, Vincent G., Ph.D., Physiology. Associate Professor of Biology, Johns Hopkins University, Baltimore, Md.

Drury, Horace F., Ph.D. Instructor, Department of Biology, Brooklyn College, Brooklyn, N. Y.

Ebel, Robert, Ph.D. Chief Chemist, Rubber Chemicals Dept., Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

Eisman, Philip C., Ph.D. Research Bacteriologist, Ciba Pharmaceutical Products, Summit, N. J.

Ellinger, Friedrich P., M.D., Biology. Director and Research Associate, Lab. of Radiation Therapy, Long Island College of Medicine, Brooklyn, N. Y.

Epstein, Nathan, M.D., Ph.D., Medicine, Biochemistry, Pediatrics, Rheumatic Fever Research. Research Fellow, Cornell Medical School; Asst. Physician, Out-Patient Dept., New York Hospital, New York, N. Y.

Fellows, Edwin J., Ph.D. Associate Professor of Pharmacology, Temple University School of Medicine, Philadelphia, Pa.

Ficarra, Bernard J., M.D. Professor of Research Biology and Experimental Physiology, St. Francis College, Brooklyn, N. Y.

Finkelstein, Murray, M.S. Fellow, Department of Pharmacology, Cornell Medical School, New York, N. Y.

Fox, John P., M.D., Ph.D., Immunology, Virus and Rickettsial Diseases. Staff Member, International Health Division, Rockefeller Foundation, New York, N. Y.

Frank, Edward D., M.D., Medicine, Physiology. Resident in Surgery, Beth Israel Hospital, Boston, Mass.

Freeman, Marion L. H., Chemotherapy in Cancer. Research Asst., Syracuse University College of Medicine, Syracuse, N. Y.

Friedman, Arnold P., M.D., Neuropsychiatry, Research on Headaches. Associate in Neurology, Coll. of Phys. and Surgs., Columbia University; Adjunct Attending Physician, Division of Neuropsychiatry, Montefiore Hospital, New York, N. Y.

Fulop, Milford, B.A. Medical Student, Coll. of Phys. and Surgs., Columbia University, New York, N. Y.

Glaser, Elizabeth B., Ph.D., Cancer. Consulting Chemist, International Latex Corp., New York, N. Y.

Goldberg, Alfred, M.D., Medical Research. Research Associate, Institute for Medical Research, Cedars of Lebanon Hospital, Hollywood, Calif.

Grant, Vernon W., Ph.D., Social Psychology, Psychometric Method, Theory of Sex. Associate Professor of Psychology, Adelphi College, Garden City, Long Island, N. Y.

Greif, Roger L., M.D. Asst. Resident Physician, Rockefeller Institute Hospital, New York, N. Y.

Grunberg, Emanuel, Ph.D. Senior Bacteriologist, Chemotherapy Lab., Hoffmann-LaRoche, Inc., Nutley, N. J.

Gyorgy, Paul, M.D., Medical Research: Nutrition, Hormones. Professor of Clinical Pediatrics, University of Pennsylvania, Philadelphia, Pa.

Hillman, Robert W., M.D., Nutrition, Metabolism. Resident Physician, Columbia Research Service, Goldwater Memorial Hospital, Welfare Island, New York, N. Y.

Hofbauer, Isfred, M.D., Obstetrics, Gynecology, Biology. Cincinnati, Ohio.

Hooker, Sanford B., M.D. Professor of Immunology, Boston University School of Medicine, Boston, Mass.

Hopkins, Joseph Gardner, M.D. Emeritus Professor of Dermatology, Columbia University, New York, N. Y.

Horowitz, Sidney L., D.D.S. Instructor, Pedodontia Department, New York University College of Dentistry, New York, N. Y.

Hoyer, Bill Henriksen, M. S. Instructor in Bacteriology, University of Minnesota, Minneapolis, Minn.

Humphrey, Rufus R., Ph.D., Histology, Embryology, Experimental Zoology. Professor of Anatomy, University of Buffalo School of Medicine, Buffalo, N. Y.

Jampolsky, L. M., Ph.D. Research Chemist, Hoffman-LaRoche, Inc., Nutley, N. J.

Kann, Susan, Ph.D., Biochemistry, Biology. Research Asst., Mt. Sinai Hospital, New York, N. Y.

Kayden, Herbert Jay, M.D., Medicine. Dobbs Ferry, N. Y.

King, John W., M.D., Ph.D. Asst. Professor of Bacteriology and Clinical Pathology, University of Vermont College of Medicine, Burlington, Vt.

Kitay, Philip M., Ph.D., Social Psychology, Psychology of Personality. Assistant Professor of Psychology, Adelphi College, Garden City, Long Island, N. Y.

Kurnick, N. B., M.D., Biological Chemistry. Fellow, National Research Council, Rockefeller Institute, New York, N. Y.

Kushner, Rose Estrin, Ph.D. Instructor in Psychology, College of the City of New York, New York, N. Y.

Lamden, Merton Philip, Ph.D., Nutritional Biochemistry. Asst. Professor of Biochemistry, University of Vermont College of Medicine, Burlington, Vt.

Lee, Stanley L., M.D., Internal Medicine. Asst. Resident in Medicine, Mt. Sinai Hospital, New York, N. Y.

Lieben, Fritz, Ph.D., Biochemistry. Research Fellow, Mt. Sinai Hospital, New York, N. Y.

Maier, Nelicia, M.D., Ph.D. Research Biochemist, Montefiore Hospital, New York, N. Y.

Martin, Jerome, Ph.D., Organic Chemistry, Biochemistry. Director of Research, Commercial Solvents Corp., Terre Haute, Ind.

Mayer, Rudolph L., M.D. Chief Microbiologist, Ciba Pharmaceutical Products, Summit, N. J.

Merksamer, David, M.D. Asst. Allergist, Israel Zion Hospital; Clinical Asst. in Allergy, Jewish Hospital of Brooklyn; Asst. Visiting Physician, Kingston Ave. Hospital, Brooklyn, N. Y.

Miguel, Ovidio, M.D., Enzymes, Biology. Instructor in Physiology and Pharmacology, School of Medicine; Physician, Infectious Diseases Hospital, Asuncion, Paraguay.

Miller, Helena A., Ph.D., Biology, Botany, De-

velopmental Anatomy. Instructor in Botany, Wellesley College, Wellesley, Mass.

Miller, Lloyd C., Ph.D., Pharmacology. Director, Biology Division, Sterling-Winthrop Research Institute, Rensselaer, N. Y.

Nestler, Frederick H. M., Ph.D., Surface Chemistry, Adsorption Studies. Post-Doctoral Research Fellow, Yale University, New Haven, Conn.

Omohundro, A. L., Ph.D., Organic and Biochemistry as Applied to Medicine. Vice-President and Technical Director in Charge of Research Labs. and Technical Operations, McKesson & Robbins, Bridgeport, Conn.

Pader, Morton, M.S., Biochemistry. Graduate Student, New York University, New York, N. Y.

Parker, Robert Prescott, Ph.D., Organic Pharmaceutical Chemical Research. Asst. Research Director, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

Penner, Abraham, M.D., Physiology, Pathology, Shock. Adjunct Physician, Mt. Sinai Hospital, New York, N. Y.

Pressman, David, Ph.D., Immunochemistry. Senior Fellow, American Cancer Society, Sloan-Kettering Institute, New York, N. Y.

Prigal, Samuel J., M.D., Allergy, Aereal Therapy. Asst. Clinical Professor of Medicine, New York Medical College; Chief, Allergy Clinic, Flower Fifth Ave. Hospital, New York, N. Y.

Ralli, Elaine P., M.D., Diseases of Metabolism. Associate Professor of Medicine, New York University, College of Medicine, New York, N. Y.

Rich, Alexander, B.A., Physical Biology. Medical Student, Harvard Medical School, Boston, Mass.

Rieveschl, George, Jr., Ph.D., Synthetic Medicinals. Assistant to Director of Chemical Research, Parke, Davis & Co., Detroit, Mich.

Rosoff, Meyer L., D.D.S., Oral Surgery. Research, N. Y. Institute of Clinical Oral Pathology, New York, N. Y.

Roth, Jay S., Ph.D., Biochemistry. Asst. Professor of Chemistry, Rutgers University, New Brunswick, N. J.

Schedl, Harold, Ph.D. Research Chemist, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

Schein, Albert J., M.D., Medicine, Biology, Anthropology. Assistant Orthopedist, Mt. Sinai Hospital; Bellevue Hospital; Instructor, New York University Medical College, New York, N. Y.

Schnitzer, Robert J., M.D., Chemotherapy, Immunology. Head, Chemotherapy Lab., Hoffmann-LaRoche, Inc., Nutley, N. J.

Schwartz, Simon Michale, D.D., M.D., Drugs, Chemicals, Psychology. Medical Director, Boyle & Co., Los Angeles, Calif.

Scull, C. Wesler, Ph.D. Asst. Director of Research, Smith, Kline & French Labs., Philadelphia, Pa.

Sease, John W., Ph.D., Organic Chemistry, Chromatography. Instructor, Wesleyan University, Middletown, Conn.

Spielman, Aaron D., M.D., Allergy. Instructor in Medicine, Cornell University Medical School, New York, N. Y.

Stadler, Marilyn, M.A. Research Bacteriologist, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

Steinberg, Eliot, M.S. Organic Research Chemist, Maltine Co., Brooklyn, N. Y.

Stewart, Hugh W., Ph.D. Research Chemist, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

Suter, C. M., Sc.D., Ph.D., Chemistry. Associate Director of Research, Sterling-Winthrop Research Institute, Rensselaer, N. Y.

Taylor, Harriett E., Ph.D., Heredity in Microorganisms. Visiting Investigator, Institut de Biologie, Paris, France.

Tornaben, John Arthur, M.S. Research in Pharmacology, Histology, Pathology, Wellcome Research Labs., Tuckahoe, N. Y.

Trueblood, Kenneth N., Ph.D. Research Fellow in Chemistry, California Institute of Technology, Pasadena, Calif.

Tuchman, Lester R., M.D., Internal Medicine, Biochemistry. Adjunct Physician, Mt. Sinai Hospital; Asst. Physician, N. Y. City Hospital; Associate Professor of Clinical Medicine, New York Medical College, New York, N. Y.

Weill, Paul B. A., Ph.D., Chemistry, Biology. New York, N. Y.

Weinick, Steven S., M.S., Organic Chemistry. Teacher of Chemistry, Brooklyn Technical High School; Student, New York University, New York, N. Y.

Wertheim, Arthur Robert, M.D. Research Fellow, Goldwater Memorial Hospital, Welfare Island, New York, N. Y.

Zazeela, Herman, M.D., Medicine. New York, N. Y.

Zucker, Howard D., M.D., Internal Medicine. Asst. Medical Resident, Montefiore Hospital, New York, N. Y.

STUDENT MEMBERSHIP

Bonsib, Dee Anne, B.A., Clinical Child Psychology. Student, University of Chicago, Chicago, Ill.

Pickhardt, William Paul, II, B.S., Organic Chemistry. Graduate Student, Yale University, New Haven, Conn.

Rosenthal, William Sanford, B.A. Student, Long Island College of Medicine, Brooklyn, N. Y.

Thompson, Violet K., M.A. Psychological Counselor, Psychiatric Clinic, Marble Collegiate Church, New York, N. Y.